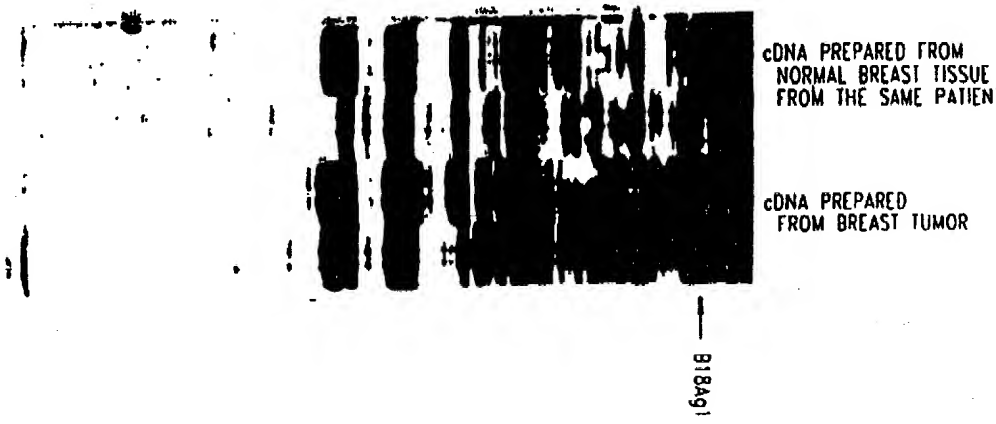


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(21) International Application Number: PCT/US00/09312 (22) International Filing Date: 7 April 2000 (07.04.00) (30) Priority Data: <table border="0"> <tr> <td>09/289,198</td> <td>9 April 1999 (09.04.99)</td> <td>US</td> </tr> <tr> <td>09/429,755</td> <td>28 October 1999 (28.10.99)</td> <td>US</td> </tr> <tr> <td>09/534,825</td> <td>23 March 2000 (23.03.00)</td> <td>US</td> </tr> </table> (71) Applicant: CORIXA CORPORATION [US/US]; Suite 200, 1124 Columbia Street, Seattle, WA 98104 (US). (72) Inventors: FRUDAKIS, Tony, N.; 7937 Broadmoor Pines Boulevard, Sarasota, FL 34243 (US). SMITH, John, M.; 208 - 116th Place S.E., Everett, WA 98208 (US). REED, Steven, G.; 2843 - 122nd Place N.E., Bellevue, WA 98005 (US). MISHNER, Lynda, E.; 6251 53rd Avenue N.E., Seattle, WA 98115 (US). RETTER, Marc, W.; 33402 N.E. 43rd Place, Carnation, WA 98014 (US). DILLON, Davin, C.; 21607 N.E. 24th Street, Redmond, WA 98053 (US). (74) Agents: POTTER, Jane, E., R.; Seed Intellectual Property Law Group PLLC, Suite 6300, 701 Fifth Avenue, Seattle, WA 98104-7092 (US) et al.	09/289,198	9 April 1999 (09.04.99)	US	09/429,755	28 October 1999 (28.10.99)	US	09/534,825	23 March 2000 (23.03.00)	US	(81) Designated States: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG). Published <i>Without international search report and to be republished upon receipt of that report.</i>
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(54) Title: COMPOSITIONS AND METHODS FOR THE TREATMENT AND DIAGNOSIS OF BREAST CANCER <div style="text-align: center;">  </div> (57) Abstract Compositions and methods for the detection and therapy of breast cancer are disclosed. The compounds provided include nucleotide sequences that are preferentially expressed in breast tumor tissue, as well as polypeptides encoded by such nucleotide sequences. Vaccines and pharmaceutical compositions comprising such compounds are also provided and may be used, for example, for the prevention and treatment of breast cancer. The polypeptides may also be used for the production of antibodies, which are useful for diagnosing and monitoring the progression of breast cancer in a patient.										

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COMPOSITIONS AND METHODS FOR THE TREATMENT AND DIAGNOSIS OF BREAST CANCER

TECHNICAL FIELD

The present invention relates generally to the detection and therapy of breast cancer. The invention is more specifically related to nucleotide sequences that are preferentially expressed in breast tumor tissue and to polypeptides encoded by such nucleotide sequences. The nucleotide sequences and polypeptides may be used in vaccines and pharmaceutical compositions for the prevention and treatment of breast cancer. The polypeptides may also be used for the production of compounds, such as antibodies, useful for diagnosing and monitoring the progression of breast cancer in a patient.

BACKGROUND OF THE INVENTION

Breast cancer is a significant health problem for women in the United States and throughout the world. Although advances have been made in detection and treatment of the disease, breast cancer remains the second leading cause of cancer-related deaths in women, affecting more than 180,000 women in the United States each year. For women in North America, the life-time odds of getting breast cancer are now one in eight.

No vaccine or other universally successful method for the prevention or treatment of breast cancer is currently available. Management of the disease currently relies on a combination of early diagnosis (through routine breast screening procedures) and aggressive treatment, which may include one or more of a variety of treatments such as surgery, radiotherapy, chemotherapy and hormone therapy. The course of treatment for a particular breast cancer is often selected based on a variety of prognostic parameters, including an analysis of specific tumor markers. See, e.g., Porter-Jordan and Lippman, *Breast Cancer* 8:73-100 (1994). However, the use of established markers often leads to a result that is difficult to interpret, and the high mortality observed in

breast cancer patients indicates that improvements are needed in the treatment, diagnosis and prevention of the disease.

Accordingly, there is a need in the art for improved methods for therapy and diagnosis of breast cancer. The present invention fulfills these needs and further provides other related advantages.

SUMMARY OF THE INVENTION

Briefly stated, the subject invention provides compositions and methods for the diagnosis and therapy of breast cancer. In one aspect, isolated polynucleotides are provided, comprising (a) a nucleotide sequence preferentially expressed in breast cancer tissue, relative to normal tissue; (b) a variant of such a sequence, as defined below; or (c) a nucleotide sequence encoding an epitope of a polypeptide encoded by at least one of the above sequences. In one embodiment, the isolated polynucleotide comprises a human endogenous retroviral sequence recited in SEQ ID NO: 1. In other embodiments, the isolated polynucleotide comprises a sequence recited in any one of SEQ ID NO: 3-26, 28-77, 142, 143, 146-152, 154-166, 168-176, 178-192, 194-198, 200-204, 206, 207, 209-214, 216, 218, 219, 221-240, 243-245, 247, 250, 251, 253, 255, 257-266, 268, 269, 271-273, 275, 276, 278, 280, 281, 284, 288, 291-298, 301-303, 307, 313, 314, 316 and 317.

In related embodiments, the isolated polynucleotide encodes an epitope of a polypeptide, wherein the polypeptide is encoded by a nucleotide sequence that: (a) hybridizes to a sequence recited in any one of SEQ ID NO: 1, 3-26, 28-77, 142, 143, 146-152, 154-166, 168-176, 178-192, 194-198, 200-204, 206, 207, 209-214, 216, 218, 219, 221-240, 243-245, 247, 250, 251, 253, 255, 257-266, 268, 269, 271-273, 275, 276, 278, 280, 281, 284, 288, 291-298, 301-303, 307, 313, 314, 316 and 317 under stringent conditions; and (b) is at least 80% identical to a sequence recited in any one of SEQ ID NO: 1, 3-26, 28-77, 142, 143, 146-152, 154-166, 168-176, 178-192, 194-198, 200-204, 206, 207, 209-214, 216, 218, 219, 221-240, 243-245, 247, 250, 251, 253, 255, 257-266, 268, 269, 271-273, 275, 276, 278, 280, 281, 284, 288, 291-298, 301-303, 307, 313, 314, 316 and 317.

In another embodiment, the present invention provides an isolated polynucleotide encoding an epitope of a polypeptide, the polypeptide being encoded by:

(a) a nucleotide sequence transcribed from the sequence of SEQ ID NO: 141; or (b) a variant of said nucleotide sequence that contains one or more nucleotide substitutions, deletions, insertions and/or modifications at no more than 20% of the nucleotide positions, such that the antigenic and/or immunogenic properties of the polypeptide encoded by the nucleotide sequence are retained. Isolated DNA and RNA molecules comprising a nucleotide sequence complementary to a polynucleotide as described above are also provided.

In related aspects, the present invention provides recombinant expression vectors comprising a polynucleotide as described above and host cells transformed or transfected with such expression vectors.

In further aspects, polypeptides comprising an amino acid sequence encoded by a polynucleotide as described above, and monoclonal antibodies that bind to such polypeptides are provided. In certain embodiments, the inventive polypeptides comprise an amino acid sequence selected from the group consisting of SEQ ID NO: 299, 300, 304-306, 308 and 315, and variants thereof as defined below.

In yet another aspect, methods are provided for determining the presence of breast cancer in a patient. In one embodiment, the method comprises detecting, within a biological sample, a polypeptide as described above. In another embodiment, the method comprises detecting, within a biological sample, an RNA molecule encoding a polypeptide as described above. In yet another embodiment, the method comprises (a) intradermally injecting a patient with a polypeptide as described above; and (b) detecting an immune response on the patient's skin and therefrom detecting the presence of breast cancer in the patient. In further embodiments, the present invention provides methods for determining the presence of breast cancer in a patient as described above wherein the polypeptide is encoded by a nucleotide sequence selected from the group consisting of SEQ ID NO: 78-86, 144, 145, 153, 167, 177, 193, 199, 205, 208, 215, 217, 220, 241, 242, 246, 248, 249, 252, 256, 267, 270, 274, 277, 279, 282, 283, 285-287, 289, 290 and sequences that hybridize thereto under stringent conditions.

In a related aspect, diagnostic kits useful in the determination of breast cancer are provided. The diagnostic kits generally comprise either one or more monoclonal antibodies as described above, or one or more monoclonal antibodies that bind to a polypeptide encoded by a nucleotide sequence selected from the group consisting of sequences provided in SEQ ID NO: 78-86, 144, 145, 153, 167, 177, 193, 199, 205, 208, 215, 217, 220, 241, 242 and 246, 248, 249, 252, 256, 267, 270, 274, 277, 279, 282, 283, 285-287, 289, 290 and a detection reagent.

Diagnostic kits are also provided that comprise a first polymerase chain reaction primer and a second polymerase chain reaction primer, at least one of the primers being specific for a polynucleotide described herein. In one embodiment, at least one of the primers comprises at least about 10 contiguous nucleotides of a polynucleotide as described above, or a polynucleotide encoding a polypeptide encoded by a sequence selected from the group consisting of SEQ ID NO: 78-86, 144, 145, 153, 167, 177, 193, 199, 205, 208, 215, 217, 220, 241, 242, 246, 248, 249, 252, 256, 267, 270, 274, 277, 279, 282, 283, 285-287, 289 and 290.

Within another related aspect, the diagnostic kit comprises at least one oligonucleotide probe, the probe being specific for a polynucleotide described herein. In one embodiment, the probe comprises at least about 15 contiguous nucleotides of a polynucleotide as described above, or a polynucleotide selected from the group consisting of SEQ ID NO: 78-86, 144, 145, 153, 167, 177, 193, 199, 205, 208, 215, 217, 220, 241, 242, 246, 248, 249, 252, 256, 267, 270, 274, 277, 279, 282, 283, 285-287, 289 and 290.

In another related aspect, the present invention provides methods for monitoring the progression of breast cancer in a patient. In one embodiment, the method comprises: (a) detecting an amount, in a biological sample, of a polypeptide as described above at a first point in time; (b) repeating step (a) at a subsequent point in time; and (c) comparing the amounts of polypeptide detected in steps (a) and (b), and therefrom monitoring the progression of breast cancer in the patient. In another embodiment, the method comprises (a) detecting an amount, within a biological sample, of an RNA molecule encoding a polypeptide as described above at a first point in time; (b) repeating

step (a) at a subsequent point in time; and (c) comparing the amounts of RNA molecules detected in steps (a) and (b), and therefrom monitoring the progression of breast cancer in the patient. In yet other embodiments, the present invention provides methods for monitoring the progression of breast cancer in a patient as described above wherein the polypeptide is encoded by a nucleotide sequence selected from the group consisting of SEQ ID NO: 78-86, 144, 145, 153, 167, 177, 193, 199, 205, 208, 215, 217, 220, 241, 242, 246, 248, 249, 252, 256, 267, 270, 274, 277, 279, 282, 283, 285-287, 289, 290 and sequences that hybridize thereto under stringent conditions.

In still other aspects, pharmaceutical compositions, which comprise a polypeptide as described above in combination with a physiologically acceptable carrier, and vaccines, which comprise a polypeptide as described above in combination with an immunostimulant or adjuvant, are provided. In yet other aspects, the present invention provides pharmaceutical compositions and vaccines comprising a polypeptide encoded by a nucleotide sequence selected from the group consisting of SEQ ID NO: 78-86, 144, 145, 153, 167, 177, 193, 199, 205, 208, 215, 217, 220, 241, 242 and 246, 248, 249, 252, 256, 267, 270, 274, 277, 279, 282, 283, 285-287, 289, 290 and sequences that hybridize thereto under stringent conditions.

In related aspects, the present invention provides methods for inhibiting the development of breast cancer in a patient, comprising administering to a patient a pharmaceutical composition or vaccine as described above.

These and other aspects of the present invention will become apparent upon reference to the following detailed description and attached drawings. All references disclosed herein are hereby incorporated by reference in their entirety as if each was incorporated individually.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 shows the differential display PCR products, separated by gel electrophoresis, obtained from cDNA prepared from normal breast tissue (lanes 1 and 2) and from cDNA prepared from breast tumor tissue from the same patient (lanes 3 and 4). The arrow indicates the band corresponding to B18Ag1.

Figure 2 is a northern blot comparing the level of B18Ag1 mRNA in breast tumor tissue (lane 1) with the level in normal breast tissue.

Figure 3 shows the level of B18Ag1 mRNA in breast tumor tissue compared to that in various normal and non-breast tumor tissues as determined by RNase protection assays.

Figure 4 is a genomic clone map showing the location of additional retroviral sequences obtained from ends of XbaI restriction digests (provided in SEQ ID NO:3 - SEQ ID NO:10) relative to B18Ag1.

Figures 5A and 5B show the sequencing strategy, genomic organization and predicted open reading frame for the retroviral element containing B18Ag1.

Figure 6 shows the nucleotide sequence of the representative breast tumor-specific cDNA B18Ag1.

Figure 7 shows the nucleotide sequence of the representative breast tumor-specific cDNA B17Ag1.

Figure 8 shows the nucleotide sequence of the representative breast tumor-specific cDNA B17Ag2.

Figure 9 shows the nucleotide sequence of the representative breast tumor-specific cDNA B13Ag2a.

Figure 10 shows the nucleotide sequence of the representative breast tumor-specific cDNA B13Ag1b.

Figure 11 shows the nucleotide sequence of the representative breast tumor-specific cDNA B13Ag1a.

Figure 12 shows the nucleotide sequence of the representative breast tumor-specific cDNA B11Ag1.

Figure 13 shows the nucleotide sequence of the representative breast tumor-specific cDNA B3CA3c.

Figure 14 shows the nucleotide sequence of the representative breast tumor-specific cDNA B9CG1.

Figure 15 shows the nucleotide sequence of the representative breast tumor-specific cDNA B9CG3.

Figure 16 shows the nucleotide sequence of the representative breast tumor-specific cDNA B2CA2.

Figure 17 shows the nucleotide sequence of the representative breast tumor-specific cDNA B3CA1.

5 Figure 18 shows the nucleotide sequence of the representative breast tumor-specific cDNA B3CA2.

Figure 19 shows the nucleotide sequence of the representative breast tumor-specific cDNA B3CA3.

10 Figure 20 shows the nucleotide sequence of the representative breast tumor-specific cDNA B4CA1.

Figure 21A depicts RT-PCR analysis of breast tumor genes in breast tumor tissues (lanes 1-8) and normal breast tissues (lanes 9-13) and H₂O (lane 14).

15 Figure 21B depicts RT-PCR analysis of breast tumor genes in prostate tumors (lane 1, 2), colon tumors (lane 3), lung tumor (lane 4), normal prostate (lane 5), normal colon (lane 6), normal kidney (lane 7), normal liver (lane 8), normal lung (lane 9), normal ovary (lanes 10, 18), normal pancreases (lanes 11, 12), normal skeletal muscle (lane 13), normal skin (lane 14), normal stomach (lane 15), normal testes (lane 16), normal small intestine (lane 17), HBL-100 (lane 19), MCF-12A (lane 20), breast tumors (lanes 21-23), H₂O (lane 24), and colon tumor (lane 25).

20 Figure 22 shows the recognition of a B11Ag1 peptide (referred to as B11-8) by an anti-B11-8 CTL line.

Figure 23 shows the recognition of a cell line transduced with the antigen B11Ag1 by the B11-8 specific clone A1.

25 Figure 24 shows recognition of a lung adenocarcinoma line (LT-140-22) and a breast adenocarcinoma line (CAMA-1) by the B11-8 specific clone A1.

DETAILED DESCRIPTION OF THE INVENTION

As noted above, the present invention is generally directed to compositions and methods for the diagnosis, monitoring and therapy of breast cancer. The compositions described herein include polypeptides, polynucleotides and antibodies.

Polypeptides of the present invention generally comprise at least a portion of a protein that is expressed at a greater level in human breast tumor tissue than in normal breast tissue (*i.e.*, the level of RNA encoding the polypeptide is at least 2-fold higher in tumor tissue). Such polypeptides are referred to herein as breast tumor-specific polypeptides, and cDNA molecules encoding such polypeptides are referred to as breast tumor-specific cDNAs. Polynucleotides of the subject invention generally comprise a DNA or RNA sequence that encodes all or a portion of a polypeptide as described above, or that is complementary to such a sequence. Antibodies are generally immune system proteins, or fragments thereof, that are capable of binding to a portion of a polypeptide as described above. Antibodies can be produced by cell culture techniques, including the generation of monoclonal antibodies as described herein, or via transfection of antibody genes into suitable bacterial or mammalian cell hosts, in order to allow for the production of recombinant antibodies.

Polypeptides within the scope of this invention include, but are not limited to, polypeptides (and epitopes thereof) encoded by a human endogenous retroviral sequence, such as the sequence designated B18Ag1 (Figure 5 and SEQ ID NO:1). Also within the scope of the present invention are polypeptides encoded by other sequences within the retroviral genome containing B18Ag1 (SEQ ID NO: 141). Such sequences include, but are not limited to, the sequences recited in SEQ ID NO:3 - SEQ ID NO:10. B18Ag1 has homology to the *gag* p30 gene of the endogenous human retroviral element S71, as described in Werner et al., *Virology* 174:225-238 (1990) and also shows homology to about thirty other retroviral *gag* genes. As discussed in more detail below, the present invention also includes a number of additional breast tumor-specific polypeptides, such as those encoded by the nucleotide sequences recited in SEQ ID NO: 11-26, 28-77, 142, 143, 146-152, 154-166, 168-176, 178-192, 194-198, 200-204, 206, 207, 209-214, 216, 218, 219, 221-240, 243-245, 247, 250, 251, 253, 255, 257-266, 268, 269, 271-273, 275, 276, 278, 280, 281, 284, 288, 291-298, 301-303, 307, 313, 314, 316 and 317.

As used herein, the term "polypeptide" encompasses amino acid chains of any length, including full length proteins containing the sequences recited herein. A

polypeptide comprising an epitope of a protein containing a sequence as described herein may consist entirely of the epitope, or may contain additional sequences. The additional sequences may be derived from the native protein or may be heterologous, and such sequences may (but need not) possess immunogenic or antigenic properties.

5 An "epitope," as used herein, is a portion of a polypeptide that is recognized (*i.e.*, specifically bound) by a B-cell and/or T-cell, surface antigen receptor. Epitopes may generally be identified using well known techniques, such as those summarized in Paul, *Fundamental Immunology*, 3rd ed., 243-247 (Raven Press, 1993) and references cited therein. Such techniques include screening polypeptides derived
10 from the native polypeptide for the ability to react with antigen-specific antisera and/or T-cell lines or clones. An epitope of a polypeptide is a portion that reacts with such antisera and/or T-cells at a level that is similar to the reactivity of the full length polypeptide (*e.g.*, in an ELISA and/or T-cell reactivity assay). Such screens may generally be performed using methods well known to those of ordinary skill in the art,
15 such as those described in Harlow and Lane, *Antibodies: A Laboratory Manual*, Cold Spring Harbor Laboratory, 1988. B-cell and T-cell epitopes may also be predicted via computer analysis. Polypeptides comprising an epitope of a polypeptide that is preferentially expressed in a tumor tissue (with or without additional amino acid sequence) are within the scope of the present invention.

20 The term "polynucleotide(s)," as used herein, means a single or double-stranded polymer of deoxyribonucleotide or ribonucleotide bases and includes DNA and corresponding RNA molecules, including HnRNA and mRNA molecules, both sense and anti-sense strands, and comprehends cDNA, genomic DNA and recombinant DNA, as well as wholly or partially synthesized polynucleotides. An HnRNA molecule contains
25 introns and corresponds to a DNA molecule in a generally one-to-one manner. An mRNA molecule corresponds to an HnRNA and DNA molecule from which the introns have been excised. A polynucleotide may consist of an entire gene, or any portion thereof. Operable anti-sense polynucleotides may comprise a fragment of the corresponding polynucleotide, and the definition of "polynucleotide" therefore includes
30 all such operable anti-sense fragments.

The compositions and methods of the present invention also encompass variants of the above polypeptides and polynucleotides.

A polypeptide "variant," as used herein, is a polypeptide that differs from the recited polypeptide only in conservative substitutions and/or modifications, such that the antigenic properties of the polypeptide are retained. In a preferred embodiment, variant polypeptides differ from an identified sequence by substitution, deletion or addition of five amino acids or fewer. Such variants may generally be identified by modifying one of the above polypeptide sequences, and evaluating the antigenic properties of the modified polypeptide using, for example, the representative procedures described herein. Polypeptide variants preferably exhibit at least about 70%, more preferably at least about 90% and most preferably at least about 95% identity (determined as described below) to the identified polypeptides.

As used herein, a "conservative substitution" is one in which an amino acid is substituted for another amino acid that has similar properties, such that one skilled in the art of peptide chemistry would expect the secondary structure and hydrophobic nature of the polypeptide to be substantially unchanged. In general, the following groups of amino acids represent conservative changes: (1) ala, pro, gly, glu, asp, gln, asn, ser, thr; (2) cys, ser, tyr, thr; (3) val, ile, leu, met, ala, phe; (4) lys, arg, his; and (5) phe, tyr, trp, his.

Variants may also, or alternatively, contain other modifications, including the deletion or addition of amino acids that have minimal influence on the antigenic properties, secondary structure and hydrophobic nature of the polypeptide. For example, a polypeptide may be conjugated to a signal (or leader) sequence at the N-terminal end of the protein which co-translationally or post-translationally directs transfer of the protein. The polypeptide may also be conjugated to a linker or other sequence for ease of synthesis, purification or identification of the polypeptide (e.g., poly-His), or to enhance binding of the polypeptide to a solid support. For example, a polypeptide may be conjugated to an immunoglobulin Fc region.

A nucleotide "variant" is a sequence that differs from the recited nucleotide sequence in having one or more nucleotide deletions, substitutions or

additions. Such modifications may be readily introduced using standard mutagenesis techniques, such as oligonucleotide-directed site-specific mutagenesis as taught, for example, by Adelman et al. (*DNA*, 2:183, 1983). Nucleotide variants may be naturally occurring allelic variants, or non-naturally occurring variants. Variant nucleotide sequences preferably exhibit at least about 70%, more preferably at least about 80% and most preferably at least about 90% identity (determined as described below) to the recited sequence.

The breast tumor antigens provided by the present invention include variants that are encoded by DNA sequences which are substantially homologous to one or more of the DNA sequences specifically recited herein. "Substantial homology," as used herein, refers to DNA sequences that are capable of hybridizing under moderately stringent conditions. Suitable moderately stringent conditions include prewashing in a solution of 5X SSC, 0.5% SDS, 1.0 mM EDTA (pH 8.0); hybridizing at 50°C-65°C, 5X SSC, overnight or, in the event of cross-species homology, at 45°C with 0.5X SSC; followed by washing twice at 65°C for 20 minutes with each of 2X, 0.5X and 0.2X SSC containing 0.1% SDS. Such hybridizing DNA sequences are also within the scope of this invention, as are nucleotide sequences that, due to code degeneracy, encode an immunogenic polypeptide that is encoded by a hybridizing DNA sequence.

Two nucleotide or polypeptide sequences are said to be "identical" if the sequence of nucleotides or amino acid residues in the two sequences is the same when aligned for maximum correspondence as described below. Comparisons between two sequences are typically performed by comparing the sequences over a comparison window to identify and compare local regions of sequence similarity. A "comparison window" as used herein, refers to a segment of at least about 20 contiguous positions, usually 30 to about 75, 40 to about 50, in which a sequence may be compared to a reference sequence of the same number of contiguous positions after the two sequences are optimally aligned.

Optimal alignment of sequences for comparison may be conducted using the Megalign program in the Lasergene suite of bioinformatics software (DNASTAR, Inc., Madison, WI), using default parameters. This program embodies several alignment

from suitable host/vector systems which secrete recombinant protein or polypeptide into culture media may be first concentrated using a commercially available filter. Following concentration, the concentrate may be applied to a suitable purification matrix such as an affinity matrix or an ion exchange resin. Finally, one or more reverse phase HPLC steps
5 can be employed to further purify a recombinant polypeptide.

In general, any of a variety of expression vectors known to those of ordinary skill in the art may be employed to express recombinant polypeptides of this invention. Expression may be achieved in any appropriate host cell that has been transformed or transfected with an expression vector containing a polynucleotide that
10 encodes a recombinant polypeptide. Suitable host cells include prokaryotes, yeast and higher eukaryotic cells. Preferably, the host cells employed are *E. coli*, yeast or a mammalian cell line such as COS or CHO.

Such techniques may also be used to prepare polypeptides comprising epitopes or variants of the native polypeptides. For example, variants of a native
15 polypeptide may generally be prepared using standard mutagenesis techniques, such as oligonucleotide-directed site-specific mutagenesis, and sections of the DNA sequence may be removed to permit preparation of truncated polypeptides. Portions and other variants having fewer than about 100 amino acids, and generally fewer than about 50 amino acids, may also be generated by synthetic means, using techniques well known to
20 those of ordinary skill in the art. For example, such polypeptides may be synthesized using any of the commercially available solid-phase techniques, such as the Merrifield solid-phase synthesis method, where amino acids are sequentially added to a growing amino acid chain. See Merrifield, *J. Am. Chem. Soc.* 85:2149-2146 (1963). Equipment for automated synthesis of polypeptides is commercially available from suppliers such as
25 Perkin Elmer/Applied BioSystems Division, Foster City, CA, and may be operated according to the manufacturer's instructions.

In specific embodiments, polypeptides of the present invention encompass amino acid sequences encoded by a polynucleotide having a sequence recited in any one of SEQ ID NO:1, 3-26, 28-77, 142, 143, 146-152, 154-166, 168-176, 178-192, 194-198,
30 200-204, 206, 207, 209-214, 216, 218, 219, 221-240, 243-245, 247, 250, 251, 253, 255,

257-266, 268, 269, 271-273, 275, 276, 278, 280, 281, 284, 288, 291-298, 301-303, 307, 313, 314, 316 and 317, and variants of such polypeptides. Polypeptides within the scope of the present invention also include polypeptides (and epitopes thereof) encoded by DNA sequences that hybridize to a sequence recited in any one of SEQ ID NO:1, 3-26, 28-77, 142, 143, 146-152, 154-166, 168-176, 178-192, 194-198, 200-204, 206, 207, 209-214, 216, 218, 219, 221-240, 243-245, 247, 250, 251, 253, 255, 257-266, 268, 269, 271-273, 275, 276, 278, 280, 281, 284, 288, 291-298, 301-303, 307, 313, 314, 316 and 317 under stringent conditions, wherein the DNA sequences are at least 80% identical in overall sequence to a recited sequence and wherein RNA corresponding to the nucleotide sequence is expressed at a greater level in human breast tumor tissue than in normal breast tissue. As used herein, "stringent conditions" refers to prewashing in a solution of 6X SSC, 0.2% SDS; hybridizing at 65°C, 6X SSC, 0.2% SDS overnight; followed by two washes of 30 minutes each in 1X SSC, 0.1% SDS at 65°C and two washes of 30 minutes each in 0.2 X SSC, 0.1% SDS at 65°C. Polynucleotides according to the present invention include molecules that encode any of the above polypeptides.

In another aspect of the present invention, antibodies are provided. Such antibodies may be prepared by any of a variety of techniques known to those of ordinary skill in the art. See, e.g., Harlow and Lane, *Antibodies: A Laboratory Manual*, Cold Spring Harbor Laboratory, 1988. In one such technique, an immunogen comprising the polypeptide is initially injected into any of a wide variety of mammals (e.g., mice, rats, rabbits, sheep or goats). In this step, the polypeptides of this invention may serve as the immunogen without modification. Alternatively, particularly for relatively short polypeptides, a superior immune response may be elicited if the polypeptide is joined to a carrier protein, such as bovine serum albumin or keyhole limpet hemocyanin. The immunogen is injected into the animal host, preferably according to a predetermined schedule incorporating one or more booster immunizations, and the animals are bled periodically. Polyclonal antibodies specific for the polypeptide may then be purified from such antisera by, for example, affinity chromatography using the polypeptide coupled to a suitable solid support.

Monoclonal antibodies specific for the antigenic polypeptide of interest may be prepared, for example, using the technique of Kohler and Milstein, *Eur. J. Immunol.* 6:511-519 (1976), and improvements thereto. Briefly, these methods involve the preparation of immortal cell lines capable of producing antibodies having the desired specificity (*i.e.*, reactivity with the polypeptide of interest). Such cell lines may be produced, for example, from spleen cells obtained from an animal immunized as described above. The spleen cells are then immortalized by, for example, fusion with a myeloma cell fusion partner, preferably one that is syngeneic with the immunized animal. A variety of fusion techniques may be employed. For example, the spleen cells and myeloma cells may be combined with a nonionic detergent for a few minutes and then plated at low density on a selective medium that supports the growth of hybrid cells, but not myeloma cells. A preferred selection technique uses HAT (hypoxanthine, aminopterin, thymidine) selection. After a sufficient time, usually about 1 to 2 weeks, colonies of hybrids are observed. Single colonies are selected and their culture supernatants tested for binding activity against the polypeptide. Hybridomas having high reactivity and specificity are preferred.

Monoclonal antibodies may be isolated from the supernatants of growing hybridoma colonies. In addition, various techniques may be employed to enhance the yield, such as injection of the hybridoma cell line into the peritoneal cavity of a suitable vertebrate host, such as a mouse. Monoclonal antibodies may then be harvested from the ascites fluid or the blood. Contaminants may be removed from the antibodies by conventional techniques, such as chromatography, gel filtration, precipitation, and extraction. The polypeptides of this invention may be used in the purification process in, for example, an affinity chromatography step.

Antibodies may be used, for example, in methods for detecting breast cancer in a patient. Such methods involve using an antibody to detect the presence or absence of a breast tumor-specific polypeptide as described herein in a suitable biological sample. As used herein, suitable biological samples include tumor or normal tissue biopsy, mastectomy, blood, lymph node, serum or urine samples, or other tissue, homogenate, or extract thereof obtained from a patient.

There are a variety of assay formats known to those of ordinary skill in the art for using an antibody to detect polypeptide markers in a sample. See, e.g., Harlow and Lane, *Antibodies: A Laboratory Manual*, Cold Spring Harbor Laboratory, 1988. For example, the assay may be performed in a Western blot format, wherein a protein
5 preparation from the biological sample is submitted to gel electrophoresis, transferred to a suitable membrane and allowed to react with the antibody. The presence of the antibody on the membrane may then be detected using a suitable detection reagent, as described below.

In another embodiment, the assay involves the use of antibody
10 immobilized on a solid support to bind to the polypeptide and remove it from the remainder of the sample. The bound polypeptide may then be detected using a second antibody or reagent that contains a reporter group. Alternatively, a competitive assay may be utilized, in which a polypeptide is labeled with a reporter group and allowed to bind to the immobilized antibody after incubation of the antibody with the sample. The
15 extent to which components of the sample inhibit the binding of the labeled polypeptide to the antibody is indicative of the reactivity of the sample with the immobilized antibody, and as a result, indicative of the concentration of polypeptide in the sample.

The solid support may be any material known to those of ordinary skill in the art to which the antibody may be attached. For example, the solid support may be a
20 test well in a microtiter plate or a nitrocellulose filter or other suitable membrane. Alternatively, the support may be a bead or disc, such as glass, fiberglass, latex or a plastic material such as polystyrene or polyvinylchloride. The support may also be a magnetic particle or a fiber optic sensor, such as those disclosed, for example, in U.S. Patent No. 5,359,681.

25 The antibody may be immobilized on the solid support using a variety of techniques known to those in the art, which are amply described in the patent and scientific literature. In the context of the present invention, the term "immobilization" refers to both noncovalent association, such as adsorption, and covalent attachment (which may be a direct linkage between the antigen and functional groups on the support
30 or may be a linkage by way of a cross-linking agent). Immobilization by adsorption to a

well in a microtiter plate or to a membrane is preferred. In such cases, adsorption may be achieved by contacting the antibody, in a suitable buffer, with the solid support for a suitable amount of time. The contact time varies with temperature, but is typically between about 1 hour and 1 day. In general, contacting a well of a plastic microtiter plate (such as polystyrene or polyvinylchloride) with an amount of antibody ranging from about 10 ng to about 1 μ g, and preferably about 100-200 ng, is sufficient to immobilize an adequate amount of polypeptide.

Covalent attachment of antibody to a solid support may also generally be achieved by first reacting the support with a bifunctional reagent that will react with both the support and a functional group, such as a hydroxyl or amino group, on the antibody. For example, the antibody may be covalently attached to supports having an appropriate polymer coating using benzoquinone or by condensation of an aldehyde group on the support with an amine and an active hydrogen on the binding partner (*see, e.g.*, Pierce Immunotechnology Catalog and Handbook (1991) at A12-A13).

In certain embodiments, the assay for detection of polypeptide in a sample is a two-antibody sandwich assay. This assay may be performed by first contacting an antibody that has been immobilized on a solid support, commonly the well of a microtiter plate, with the biological sample, such that the polypeptide within the sample are allowed to bind to the immobilized antibody. Unbound sample is then removed from the immobilized polypeptide-antibody complexes and a second antibody (containing a reporter group) capable of binding to a different site on the polypeptide is added. The amount of second antibody that remains bound to the solid support is then determined using a method appropriate for the specific reporter group.

More specifically, once the antibody is immobilized on the support as described above, the remaining protein binding sites on the support are typically blocked. Any suitable blocking agent known to those of ordinary skill in the art, such as bovine serum albumin or Tween 20™ (Sigma Chemical Co., St. Louis, MO). The immobilized antibody is then incubated with the sample, and polypeptide is allowed to bind to the antibody. The sample may be diluted with a suitable diluent, such as phosphate-buffered saline (PBS) prior to incubation. In general, an appropriate contact time (*i.e.*, incubation

time) is that period of time that is sufficient to detect the presence of polypeptide within a sample obtained from an individual with breast cancer. Preferably, the contact time is sufficient to achieve a level of binding that is at least 95% of that achieved at equilibrium between bound and unbound polypeptide. Those of ordinary skill in the art will
5 recognize that the time necessary to achieve equilibrium may be readily determined by assaying the level of binding that occurs over a period of time. At room temperature, an incubation time of about 30 minutes is generally sufficient.

Unbound sample may then be removed by washing the solid support with an appropriate buffer, such as PBS containing 0.1% Tween 20™. The second antibody,
10 which contains a reporter group, may then be added to the solid support. Preferred reporter groups include enzymes (such as horseradish peroxidase), substrates, cofactors, inhibitors, dyes, radionuclides, luminescent groups, fluorescent groups and biotin. The conjugation of antibody to reporter group may be achieved using standard methods known to those of ordinary skill in the art.

15 The second antibody is then incubated with the immobilized antibody-polypeptide complex for an amount of time sufficient to detect the bound polypeptide. An appropriate amount of time may generally be determined by assaying the level of binding that occurs over a period of time. Unbound second antibody is then removed and bound second antibody is detected using the reporter group. The method employed
20 for detecting the reporter group depends upon the nature of the reporter group. For radioactive groups, scintillation counting or autoradiographic methods are generally appropriate. Spectroscopic methods may be used to detect dyes, luminescent groups and fluorescent groups. Biotin may be detected using avidin, coupled to a different reporter group (commonly a radioactive or fluorescent group or an enzyme). Enzyme reporter
25 groups may generally be detected by the addition of substrate (generally for a specific period of time), followed by spectroscopic or other analysis of the reaction products.

To determine the presence or absence of breast cancer, the signal detected from the reporter group that remains bound to the solid support is generally compared to a signal that corresponds to a predetermined cut-off value established from non-tumor
30 tissue. In one preferred embodiment, the cut-off value is the average mean signal

obtained when the immobilized antibody is incubated with samples from patients without breast cancer. In general, a sample generating a signal that is three standard deviations above the predetermined cut-off value may be considered positive for breast cancer. In an alternate preferred embodiment, the cut-off value is determined using a Receiver Operator Curve, according to the method of Sackett et al., *Clinical Epidemiology: A Basic Science for Clinical Medicine*, p. 106-7 (Little Brown and Co., 1985). Briefly, in this embodiment, the cut-off value may be determined from a plot of pairs of true positive rates (i.e., sensitivity) and false positive rates (100%-specificity) that correspond to each possible cut-off value for the diagnostic test result. The cut-off value on the plot that is the closest to the upper left-hand corner (i.e., the value that encloses the largest area) is the most accurate cut-off value, and a sample generating a signal that is higher than the cut-off value determined by this method may be considered positive. Alternatively, the cut-off value may be shifted to the left along the plot, to minimize the false positive rate, or to the right, to minimize the false negative rate. In general, a sample generating a signal that is higher than the cut-off value determined by this method is considered positive for breast cancer.

In a related embodiment, the assay is performed in a flow-through or strip test format, wherein the antibody is immobilized on a membrane, such as nitrocellulose. In the flow-through test, the polypeptide within the sample bind to the immobilized antibody as the sample passes through the membrane. A second, labeled antibody then binds to the antibody-polypeptide complex as a solution containing the second antibody flows through the membrane. The detection of bound second antibody may then be performed as described above. In the strip test format, one end of the membrane to which antibody is bound is immersed in a solution containing the sample. The sample migrates along the membrane through a region containing second antibody and to the area of immobilized antibody. Concentration of second antibody at the area of immobilized antibody indicates the presence of breast cancer. Typically, the concentration of second antibody at that site generates a pattern, such as a line, that can be read visually. The absence of such a pattern indicates a negative result. In general, the amount of antibody immobilized on the membrane is selected to generate a visually

discernible pattern when the biological sample contains a level of polypeptide that would be sufficient to generate a positive signal in the two-antibody sandwich assay, in the format discussed above. Preferably, the amount of antibody immobilized on the membrane ranges from about 25 ng to about 1 μ g, and more preferably from about 50 ng to about 1 μ g. Such tests can typically be performed with a very small amount of biological sample.

The presence or absence of breast cancer in a patient may also be determined by evaluating the level of mRNA encoding a breast tumor-specific polypeptide as described herein within the biological sample (e.g., a biopsy, mastectomy and/or blood sample from a patient) relative to a predetermined cut-off value. Such an evaluation may be achieved using any of a variety of methods known to those of ordinary skill in the art such as, for example, *in situ* hybridization and amplification by polymerase chain reaction.

For example, polymerase chain reaction may be used to amplify sequences from cDNA prepared from RNA that is isolated from one of the above biological samples. Sequence-specific primers for use in such amplification may be designed based on the sequences provided in any one of SEQ ID NO: 1, 11-86, 142-298 301-303, 307, 313, 314, 316 and 317, and may be purchased or synthesized. In the case of B18Ag1, as noted herein, one suitable primer pair is B18Ag1-2 (5'ATG GCT ATT TTC GGG GGC TGA CA) (SEQ ID NO:126) and B18Ag1-3 (5'CCG GTA TCT CCT CGT GGG TAT T) (SEQ ID NO:127). The PCR reaction products may then be separated by gel electrophoresis and visualized according to methods well known to those of ordinary skill in the art. Amplification is typically performed on samples obtained from matched pairs of tissue (tumor and non-tumor tissue from the same individual) or from unmatched pairs of tissue (tumor and non-tumor tissue from different individuals). The amplification reaction is preferably performed on several dilutions of cDNA spanning two orders of magnitude. A two-fold or greater increase in expression in several dilutions of the tumor sample as compared to the same dilution of the non-tumor sample is considered positive.

As used herein, the term "primer/probe specific for a polynucleotide" means an oligonucleotide sequence that has at least about 80% identity, preferably at least about 90% and more preferably at least about 95%, identity to the polynucleotide in question, or an oligonucleotide sequence that is anti-sense to a sequence that has at least about 80% identity, preferably at least about 90% and more preferably at least about 95%, identity to the polynucleotide in question. Primers and/or probes which may be usefully employed in the inventive diagnostic methods preferably have at least about 10-40 nucleotides. In a preferred embodiment, the polymerase chain reaction primers comprise at least about 10 contiguous nucleotides of a polynucleotide that encodes one of the polypeptides disclosed herein or that is anti-sense to a sequence that encodes one of the polypeptides disclosed herein. Preferably, oligonucleotide probes for use in the inventive diagnostic methods comprise at least about 15 contiguous oligonucleotides of a polynucleotide that encodes one of the polypeptides disclosed herein or that is anti-sense to a sequence that encodes one of the polypeptides disclosed herein. Techniques for both PCR based assays and *in situ* hybridization assays are well known in the art.

Conventional RT-PCR protocols using agarose and ethidium bromide staining, while important in defining gene specificity, do not lend themselves to diagnostic kit development because of the time and effort required in making them quantitative (i.e., construction of saturation and/or titration curves), and their sample throughput. This problem is overcome by the development of procedures such as real time RT-PCR which allows for assays to be performed in single tubes, and in turn can be modified for use in 96 well plate formats. Instrumentation to perform such methodologies are available from Perkin, Elmer/Applied Biosystems Division. Alternatively, other high throughput assays using labeled probes (e.g., digoxigenin) in combination with labeled (e.g., enzyme fluorescent, radioactive) antibodies to such probes can also be used in the development of 96 well plate assays.

In yet another method for determining the presence or absence of breast cancer in a patient, one or more of the breast tumor-specific polypeptides described may be used in a skin test. As used herein, a "skin test" is any assay performed directly on a patient in which a delayed-type hypersensitivity (DTH) reaction (such as swelling,

reddening or dermatitis) is measured following intradermal injection of one or more polypeptides as described above. Such injection may be achieved using any suitable device sufficient to contact the polypeptide or polypeptides with dermal cells of the patient, such as a tuberculin syringe or 1 mL syringe. Preferably, the reaction is measured at least 48 hours after injection, more preferably 48-72 hours.

The DTH reaction is a cell-mediated immune response, which is greater in patients that have been exposed previously to a test antigen (*i.e.*, an immunogenic portion of a polypeptide employed, or a variant thereof). The response may be measured visually, using a ruler. In general, a response that is greater than about 0.5 cm in diameter, preferably greater than about 5.0 cm in diameter, is a positive response, indicative of breast cancer.

The breast tumor-specific polypeptides described herein are preferably formulated, for use in a skin test, as pharmaceutical compositions containing at least one polypeptide and a physiologically acceptable carrier, such as water, saline, alcohol, or a buffer. Such compositions typically contain one or more of the above polypeptides in an amount ranging from about 1 μ g to 100 μ g, preferably from about 10 μ g to 50 μ g in a volume of 0.1 mL. Preferably, the carrier employed in such pharmaceutical compositions is a saline solution with appropriate preservatives, such as phenol and/or Tween 80™.

In other aspects of the present invention, the progression and/or response to treatment of a breast cancer may be monitored by performing any of the above assays over a period of time, and evaluating the change in the level of the response (*i.e.*, the amount of polypeptide or mRNA detected or, in the case of a skin test, the extent of the immune response detected). For example, the assays may be performed every month to every other month for a period of 1 to 2 years. In general, breast cancer is progressing in those patients in whom the level of the response increases over time. In contrast, breast cancer is not progressing when the signal detected either remains constant or decreases with time.

In further aspects of the present invention, the compounds described herein may be used for the immunotherapy of breast cancer. In these aspects, the

compounds (which may be polypeptides, antibodies or polynucleotides) are preferably incorporated into pharmaceutical compositions or vaccines. Pharmaceutical compositions comprise one or more such compounds and a physiologically acceptable carrier. Vaccines may comprise one or more such compounds in combination with an immunostimulant, such as an adjuvant or a liposome (into which the compound is incorporated). An immunostimulant may be any substance that enhances or potentiates an immune response (antibody and/or cell-mediated) to an exogenous antigen. Examples of immunostimulants include adjuvants, biodegradable microspheres (e.g., polylactic galactide) and liposomes (into which the compound is incorporated; see e.g., Fullerton, U.S. Patent No. 4,235,877). Vaccine preparation is generally described in, for example, M.F. Powell and M.J. Newman, eds., "Vaccine Design (the subunit and adjuvant approach)," Plenum Press (NY, 1995). Pharmaceutical compositions and vaccines within the scope of the present invention may also contain other compounds, which may be biologically active or inactive. For example, one or more immunogenic portions of other tumor antigens may be present, either incorporated into a fusion polypeptide or as a separate compound, within the composition or vaccine.

Alternatively, a vaccine may contain DNA encoding one or more of the polypeptides as described above, such that the polypeptide is generated *in situ*. In such vaccines, the DNA may be present within any of a variety of delivery systems known to those of ordinary skill in the art, including nucleic acid expression systems, bacteria and viral expression systems. Appropriate nucleic acid expression systems contain the necessary DNA sequences for expression in the patient (such as a suitable promoter and terminating signal). Bacterial delivery systems involve the administration of a bacterium (such as *Bacillus-Calmette-Guerrin*) that expresses an immunogenic portion of the polypeptide on its cell surface. In a preferred embodiment, the DNA may be introduced using a viral expression system (e.g., vaccinia or other pox virus, retrovirus, or adenovirus), which may involve the use of a non-pathogenic (defective), replication competent virus. Techniques for incorporating DNA into such expression systems are well known to those of ordinary skill in the art. The DNA may also be "naked," as described, for example, in Ulmer et al., *Science* 259:1745-1749 (1993), and reviewed by

Cohen, *Science* 259:1691-1692 (1993). The uptake of naked DNA may be increased by coating the DNA onto biodegradable beads, which are efficiently transported into the cells.

While any suitable carrier known to those of ordinary skill in the art may be employed in the pharmaceutical compositions of this invention, the type of carrier will vary depending on the mode of administration. For parenteral administration, such as subcutaneous injection, the carrier preferably comprises water, saline, alcohol, a fat, a wax or a buffer. For oral administration, any of the above carriers or a solid carrier, such as mannitol, lactose, starch, magnesium stearate, sodium saccharine, talcum, cellulose, glucose, sucrose, and magnesium carbonate, may be employed. Biodegradable microspheres (e.g., polylactate polyglycolate) may also be employed as carriers for the pharmaceutical compositions of this invention.

Any of a variety of immunostimulants may be employed in the vaccines of this invention. For example, an adjuvant may be included. Most adjuvants contain a substance designed to protect the antigen from rapid catabolism, such as aluminum hydroxide or mineral oil, and a stimulator of immune responses, such as lipid A, *Bordetella pertussis* or *Mycobacterium tuberculosis* derived proteins. Suitable adjuvants are commercially available as, for example, Freund's Incomplete Adjuvant and Complete Adjuvant (Difco Laboratories, Detroit, MI); Merck Adjuvant 65 (Merck and Company, Inc., Rahway, NJ); AS-2 (SmithKline Beecham, Philadelphia, PA); aluminum salts such as aluminum hydroxide gel (alum) or aluminum phosphate; salts of calcium, iron or zinc; an insoluble suspension of acylated tyrosine; acylated sugars; cationically or anionically derivatized polysaccharides; polyphosphazenes; biodegradable microspheres; monophosphoryl lipid A and quil A. Cytokines, such as GM-CSF or interleukin-2, -7, or -12, may also be used as adjuvants.

Within the vaccines provided herein, the adjuvant composition is preferably designed to induce an immune response predominantly of the Th1 type. High levels of Th1-type cytokines (e.g., IFN- γ , TNF α , IL-2 and IL-12) tend to favor the induction of cell mediated immune responses to an administered antigen. In contrast, high levels of Th2-type cytokines (e.g., IL-4, IL-5, IL-6 and IL-10) tend to favor the

induction of humoral immune responses. Following application of a vaccine as provided herein, a patient will support an immune response that includes Th1- and Th2-type responses. Within a preferred embodiment, in which a response is predominantly Th1-type, the level of Th1-type cytokines will increase to a greater extent than the level of Th2-type cytokines. The levels of these cytokines may be readily assessed using standard assays. For a review of the families of cytokines, see Mosmann and Coffman, *Ann. Rev. Immunol.* 7:145-173, 1989.

Preferred adjuvants for use in eliciting a predominantly Th1-type response include, for example, a combination of monophosphoryl lipid A, preferably 3-de-O-acylated monophosphoryl lipid A (3D-MPL), together with an aluminum salt. MPL adjuvants are available from Corixa Corporation (Seattle, WA; see US Patent Nos. 4,436,727; 4,877,611; 4,866,034 and 4,912,094). CpG-containing oligonucleotides (in which the CpG dinucleotide is unmethylated) also induce a predominantly Th1 response. Such oligonucleotides are well known and are described, for example, in WO 96/02555 and WO 99/33488. Immunostimulatory DNA sequences are also described, for example, by Sato et al., *Science* 273:352, 1996. Another preferred adjuvant is a saponin, preferably QS21 (Aquila Biopharmaceuticals Inc., Framingham, MA), which may be used alone or in combination with other adjuvants. For example, an enhanced system involves the combination of a monophosphoryl lipid A and saponin derivative, such as the combination of QS21 and 3D-MPL as described in WO 94/00153, or a less reactogenic composition where the QS21 is quenched with cholesterol, as described in WO 96/33739. Other preferred formulations comprise an oil-in-water emulsion and tocopherol. A particularly potent adjuvant formulation involving QS21, 3D-MPL and tocopherol in an oil-in-water emulsion is described in WO 95/17210.

Other preferred adjuvants include Montanide ISA 720 (Seppic, France), SAF (Chiron, California, United States), ISCOMS (CSL), MF-59 (Chiron), the SBAS series of adjuvants (e.g., SBAS-2 or SBAS-4, available from SmithKline Beecham, Rixensart, Belgium), Detox (Ribi ImmunoChem Research Inc., Hamilton, MT), RC-529 (Ribi ImmunoChem Research Inc., Hamilton, MT) and Aminoalkyl glucosaminide 4-phosphates (AGPs).

Any vaccine provided herein may be prepared using well known methods that result in a combination of antigen, immunostimulant and a suitable carrier or excipient. The compositions described herein may be administered as part of a sustained release formulation (*i.e.*, a formulation such as a capsule, sponge or gel (composed of polysaccharides, for example) that effects a slow release of compound following administration). Such formulations may generally be prepared using well known technology (*see, e.g.*, Coombes et al., *Vaccine* 14:1429-1438, 1996) and administered by, for example, oral, rectal or subcutaneous implantation, or by implantation at the desired target site. Sustained-release formulations may contain a polypeptide, polynucleotide or antibody dispersed in a carrier matrix and/or contained within a reservoir surrounded by a rate controlling membrane.

Carriers for use within such formulations are biocompatible, and may also be biodegradable; preferably the formulation provides a relatively constant level of active component release. Such carriers include microparticles of poly(lactide-co-glycolide), as well as polyacrylate, latex, starch, cellulose and dextran. Other delayed-release carriers include supramolecular biovectors, which comprise a non-liquid hydrophilic core (*e.g.*, a cross-linked polysaccharide or oligosaccharide) and, optionally, an external layer comprising an amphiphilic compound, such as a phospholipid (*see e.g.*, U.S. Patent No. 5,151,254 and PCT applications WO 94/20078, WO/94/23701 and WO 96/06638). The amount of active compound contained within a sustained release formulation depends upon the site of implantation, the rate and expected duration of release and the nature of the condition to be treated or prevented.

Any of a variety of delivery vehicles may be employed within pharmaceutical compositions and vaccines to facilitate production of an antigen-specific immune response that targets tumor cells. Delivery vehicles include antigen presenting cells (APCs), such as dendritic cells, macrophages, B cells, monocytes and other cells that may be engineered to be efficient APCs. Such cells may, but need not, be genetically modified to increase the capacity for presenting the antigen, to improve activation and/or maintenance of the T cell response, to have anti-tumor effects *per se* and/or to be immunologically compatible with the receiver (*i.e.*, matched HLA

haplotype). APCs may generally be isolated from any of a variety of biological fluids and organs, including tumor and peritumoral tissues, and may be autologous, allogeneic, syngeneic or xenogeneic cells.

Certain preferred embodiments of the present invention use dendritic cells or progenitors thereof as antigen-presenting cells. Dendritic cells are highly potent APCs (Banchereau and Steinman, *Nature* 392:245-251, 1998) and have been shown to be effective as a physiological adjuvant for eliciting prophylactic or therapeutic antitumor immunity (see Timmerman and Levy, *Ann. Rev. Med.* 50:507-529, 1999). In general, dendritic cells may be identified based on their typical shape (stellate *in situ*, with marked cytoplasmic processes (dendrites) visible *in vitro*), their ability to take up, process and present antigens with high efficiency and their ability to activate naïve T cell responses. Dendritic cells may, of course, be engineered to express specific cell-surface receptors or ligands that are not commonly found on dendritic cells *in vivo* or *ex vivo*, and such modified dendritic cells are contemplated by the present invention. As an alternative to dendritic cells, secreted vesicles antigen-loaded dendritic cells (called exosomes) may be used within a vaccine (see Zitvogel et al., *Nature Med.* 4:594-600, 1998).

Dendritic cells and progenitors may be obtained from peripheral blood, bone marrow, tumor-infiltrating cells, peritumoral tissues-infiltrating cells, lymph nodes, spleen, skin, umbilical cord blood or any other suitable tissue or fluid. For example, dendritic cells may be differentiated *ex vivo* by adding a combination of cytokines such as GM-CSF, IL-4, IL-13 and/or TNF α to cultures of monocytes harvested from peripheral blood. Alternatively, CD34 positive cells harvested from peripheral blood, umbilical cord blood or bone marrow may be differentiated into dendritic cells by adding to the culture medium combinations of GM-CSF, IL-3, TNF α , CD40 ligand, LPS, flt3 ligand and/or other compound(s) that induce differentiation, maturation and proliferation of dendritic cells.

Dendritic cells are conveniently categorized as "immature" and "mature" cells, which allows a simple way to discriminate between two well characterized phenotypes. However, this nomenclature should not be construed to exclude all possible

intermediate stages of differentiation. Immature dendritic cells are characterized as APC with a high capacity for antigen uptake and processing, which correlates with the high expression of Fcγ receptor and mannose receptor. The mature phenotype is typically characterized by a lower expression of these markers, but a high expression of cell surface molecules responsible for T cell activation such as class I and class II MHC, adhesion molecules (e.g., CD54 and CD11) and costimulatory molecules (e.g., CD40, CD80, CD86 and 4-1BB).

APCs may generally be transfected with a polynucleotide encoding a polypeptide of the present invention (or portion or other variant thereof) such that the polypeptide, or an immunogenic portion thereof, is expressed on the cell surface. Such transfection may take place *ex vivo*, and a composition or vaccine comprising such transfected cells may then be used for therapeutic purposes, as described herein. Alternatively, a gene delivery vehicle that targets a dendritic or other antigen presenting cell may be administered to a patient, resulting in transfection that occurs *in vivo*. *In vivo* and *ex vivo* transfection of dendritic cells, for example, may generally be performed using any methods known in the art, such as those described in WO 97/24447, or the gene gun approach described by Mahvi et al., *Immunology and cell Biology* 75:456-460, 1997. Antigen loading of dendritic cells may be achieved by incubating dendritic cells or progenitor cells with the polypeptide, DNA (naked or within a plasmid vector) or RNA; or with antigen-expressing recombinant bacterium or viruses (e.g., vaccinia, fowlpox, adenovirus or lentivirus vectors). Prior to loading, the polypeptide may be covalently conjugated to an immunological partner that provides T cell help (e.g., a carrier molecule). Alternatively, a dendritic cell may be pulsed with a non-conjugated immunological partner, separately or in the presence of the polypeptide.

Vaccines and pharmaceutical compositions may be presented in unit-dose or multi-dose containers, such as sealed ampoules or vials. Such containers are preferably hermetically sealed to preserve sterility of the formulation until use. In general, formulations may be stored as suspensions, solutions or emulsions in oily or aqueous vehicles. Alternatively, a vaccine or pharmaceutical composition may be stored in a freeze-dried condition requiring only the addition of a sterile liquid carrier

immediately prior to use.

The above pharmaceutical compositions and vaccines may be used, for example, for the therapy of breast cancer in a patient. As used herein, a "patient" refers to any warm-blooded animal, preferably a human. A patient may or may not be afflicted with breast cancer. Accordingly, the above pharmaceutical compositions and vaccines may be used to prevent the development of breast cancer or to treat a patient afflicted with breast cancer. In a preferred embodiment, the compounds are administered either prior to or following surgical removal of primary tumors and/or treatment by administration of radiotherapy and conventional chemotherapeutic drugs. To prevent or slow the development of breast cancer, a pharmaceutical composition or vaccine comprising one or more polypeptides as described herein may be administered to a patient. Alternatively, naked DNA or plasmid or viral vector encoding the polypeptide may be administered. For treating a patient with breast cancer, the pharmaceutical composition or vaccine may comprise one or more polypeptides, antibodies or polynucleotides complementary to DNA encoding a polypeptide as described herein (e.g., antisense RNA or antisense deoxyribonucleotide oligonucleotides).

Routes and frequency of administration, as well as dosage, will vary from individual to individual. In general, the pharmaceutical compositions and vaccines may be administered by injection (e.g., intracutaneous, intramuscular, intravenous or subcutaneous), intranasally (e.g., by aspiration) or orally. Between 1 and 10 doses may be administered for a 52-week period. Preferably, 6 doses are administered, at intervals of 1 month, and booster vaccinations may be given periodically thereafter. Alternate protocols may be appropriate for individual patients. A suitable dose is an amount of a compound that, when administered as described above, is capable of promoting an anti-tumor immune response. Such response can be monitored by measuring the anti-tumor antibodies in a patient or by vaccine-dependent generation of cytolytic effector cells capable of killing the patient's tumor cells *in vitro*. Such vaccines should also be capable of causing an immune response that leads to an improved clinical outcome (e.g., more frequent remissions, complete or partial or longer disease-free survival) in vaccinated patients as compared to non-vaccinated patients. In general, for pharmaceutical

compositions and vaccines comprising one or more polypeptides, the amount of each polypeptide present in a dose ranges from about 100 μ g to 5 mg. Suitable dose sizes will vary with the size of the patient, but will typically range from about 0.1 mL to about 5 mL.

Polypeptides disclosed herein may also be employed in adoptive immunotherapy for the treatment of cancer. Adoptive immunotherapy may be broadly classified into either active or passive immunotherapy. In active immunotherapy, treatment relies on the *in vivo* stimulation of the endogenous host immune system to react against tumors with the administration of immune response-modifying agents (for example, tumor vaccines, bacterial adjuvants, and/or cytokines).

In passive immunotherapy, treatment involves the delivery of biologic reagents with established tumor-immune reactivity (such as effector cells or antibodies) that can directly or indirectly mediate antitumor effects and does not necessarily depend on an intact host immune system. Examples of effector cells include T lymphocytes (for example, CD8+ cytotoxic T-lymphocyte, CD4+ T-helper, tumor-infiltrating lymphocytes), killer cells (Natural Killer cells, lymphokine-activated killer cells), B cells, or antigen presenting cells (such as dendritic cells and macrophages) expressing the disclosed antigens. The polypeptides disclosed herein may also be used to generate antibodies or anti-idiotypic antibodies (as in U.S. Patent No. 4,918,164), for passive immunotherapy.

The predominant method of procuring adequate numbers of T-cells for adoptive immunotherapy is to grow immune T-cells *in vitro*. Culture conditions for expanding single antigen-specific T-cells to several billion in number with retention of antigen recognition *in vivo* are well known in the art. These *in vitro* culture conditions typically utilize intermittent stimulation with antigen, often in the presence of cytokines, such as IL-2, and non-dividing feeder cells. As noted above, the immunoreactive polypeptides described herein may be used to rapidly expand antigen-specific T cell cultures in order to generate sufficient number of cells for immunotherapy. In particular, antigen-presenting cells, such as dendritic, macrophage or B-cells, may be pulsed with immunoreactive polypeptides or transfected with a polynucleotide sequence(s), using

standard techniques well known in the art. For cultured T-cells to be effective in therapy, the cultured T-cells must be able to grow and distribute widely and to survive long term *in vivo*. Studies have demonstrated that cultured T-cells can be induced to grow *in vivo* and to survive long term in substantial numbers by repeated stimulation with antigen supplemented with IL-2 (see, for example, Cheever et al. *Ibid*).

The polypeptides disclosed herein may also be employed to generate and/or isolate tumor-reactive T-cells, which can then be administered to the patient. In one technique, antigen-specific T-cell lines may be generated by *in vivo* immunization with short peptides corresponding to immunogenic portions of the disclosed polypeptides. The resulting antigen specific CD8+ CTL clones may be isolated from the patient, expanded using standard tissue culture techniques, and returned to the patient.

Alternatively, peptides corresponding to immunogenic portions of the polypeptides may be employed to generate tumor reactive T cell subsets by selective *in vitro* stimulation and expansion of autologous T cells to provide antigen-specific T cells which may be subsequently transferred to the patient as described, for example, by Chang et al. (*Crit. Rev. Oncol. Hematol.*, 22(3), 213, 1996).

In another embodiment, syngeneic or autologous dendritic cells may be pulsed with peptides corresponding to at least an immunogenic portion of a polypeptide disclosed herein. The resulting antigen-specific dendritic cells may either be transferred into a patient, or employed to stimulate T cells to provide antigen-specific T cells which may, in turn, be administered to a patient. The use of peptide-pulsed dendritic cells to generate antigen-specific T cells and the subsequent use of such antigen-specific T cells to eradicate tumors in a murine model has been demonstrated by Cheever et al. ("Therapy With Cultured T Cells: Principles Revisited," *Immunological Reviews*, 157:177, 1997).

Additionally vectors expressing the disclosed polynucleotides may be introduced into stem cells taken from the patient and clonally propagated *in vitro* for autologous transplant back into the same patient. In one embodiment, cells of the immune system, such as T cells, may be isolated from the peripheral blood of a patient, using a commercially available cell separation system, such as CellPro Incorporated's (Bothell,

WA) CEPRATE™ system (see U.S. Patent No. 5,240,856; U.S. Patent No. 5,215,926; WO 89/06280; WO 91/16116 and WO 92/07243). The separated cells are stimulated with one or more of the immunoreactive polypeptides contained within a delivery vehicle, such as a microsphere, to provide antigen-specific T cells. The population of tumor antigen-specific T cells is then expanded using standard techniques and the cells are administered back to the patient.

The following Examples are offered by way of illustration and not by way of limitation.

EXAMPLES

EXAMPLE 1

PREPARATION OF BREAST TUMOR-SPECIFIC CDNAS USING DIFFERENTIAL DISPLAY RT-PCR

This Example illustrates the preparation of cDNA molecules encoding breast tumor-specific polypeptides using a differential display screen.

A. Preparation of B18Ag1 cDNA and Characterization of mRNA Expression

Tissue samples were prepared from breast tumor and normal tissue of a patient with breast cancer that was confirmed by pathology after removal from the patient. Normal RNA and tumor RNA was extracted from the samples and mRNA was isolated and converted into cDNA using a (dT)₁₂AG (SEQ ID NO:130) anchored 3' primer. Differential display PCR was then executed using a randomly chosen primer (CTTCAACCTC) (SEQ ID NO:103). Amplification conditions were standard buffer containing 1.5 mM MgCl₂, 20 pmol of primer, 500 pmol dNTP, and 1 unit of *Taq* DNA polymerase (Perkin-Elmer, Branchburg, NJ). Forty cycles of amplification were performed using 94°C denaturation for 30 seconds, 42°C annealing for 1 minute, and 72°C extension for 30 seconds. An RNA fingerprint containing 76 amplified products was

obtained. Although the RNA fingerprint of breast tumor tissue was over 98% identical to that of the normal breast tissue, a band was repeatedly observed to be specific to the RNA fingerprint pattern of the tumor. This band was cut out of a silver stained gel, subcloned into the T-vector (Novagen, Madison, WI) and sequenced.

5 The sequence of the cDNA, referred to as B18Ag1, is provided in SEQ ID NO:1. A database search of GENBANK and EMBL revealed that the B18Ag1 fragment initially cloned is 77% identical to the endogenous human retroviral element S71, which is a truncated retroviral element homologous to the Simian Sarcoma Virus (SSV). S71 contains an incomplete *gag* gene, a portion of the *pol* gene and an LTR-like structure at
10 the 3' terminus (*see* Werner et al., *Virology* 174:225-238 (1990)). B18Ag1 is also 64% identical to SSV in the region corresponding to the P30 (*gag*) locus. B18Ag1 contains three separate and incomplete reading frames covering a region which shares considerable homology to a wide variety of *gag* proteins of retroviruses which infect mammals. In addition, the homology to S71 is not just within the *gag* gene, but spans
15 several kb of sequence including an LTR.

B18Ag1-specific PCR primers were synthesized using computer analysis guidelines. RT-PCR amplification (94°C, 30 seconds; 60°C → 42°C, 30 seconds; 72°C, 30 seconds for 40 cycles) confirmed that B18Ag1 represents an actual mRNA sequence present at relatively high levels in the patient's breast tumor tissue. The primers used in
20 amplification were B18Ag1-1 (CTG CCT GAG CCA CAA ATG) (SEQ ID NO:128) and B18Ag1-4 (CCG GAG GAG GAA GCT AGA GGA ATA) (SEQ ID NO:129) at a 3.5 mM magnesium concentration and a pH of 8.5, and B18Ag1-2 (ATG GCT ATT TTC GGG GCC TGA CA) (SEQ ID NO:126) and B18Ag1-3 (CCG GTA TCT CCT CGT GGG TAT T) (SEQ ID NO:127) at 2 mM magnesium at pH 9.5. The same experiments
25 showed exceedingly low to nonexistent levels of expression in this patient's normal breast tissue (*see* Figure 1). RT-PCR experiments were then used to show that B18Ag1 mRNA is present in nine other breast tumor samples (from Brazilian and American patients) but absent in, or at exceedingly low levels in, the normal breast tissue corresponding to each cancer patient. RT-PCR analysis has also shown that the B18Ag1
30 transcript is not present in various normal tissues (including lymph node, myocardium

and liver) and present at relatively low levels in PBMC and lung tissue. The presence of B18Ag1 mRNA in breast tumor samples, and its absence from normal breast tissue, has been confirmed by Northern blot analysis, as shown in Figure 2.

The differential expression of B18Ag1 in breast tumor tissue was also confirmed by RNase protection assays. Figure 3 shows the level of B18Ag1 mRNA in various tissue types as determined in four different RNase protection assays. Lanes 1-12 represent various normal breast tissue samples, lanes 13-25 represent various breast tumor samples; lanes 26-27 represent normal prostate samples; lanes 28-29 represent prostate tumor samples; lanes 30-32 represent colon tumor samples; lane 33 represents normal aorta; lane 34 represents normal small intestine; lane 35 represents normal skin, lane 36 represents normal lymph node; lane 37 represents normal ovary; lane 38 represents normal liver; lane 39 represents normal skeletal muscle; lane 40 represents a first normal stomach sample, lane 41 represents a second normal stomach sample; lane 42 represents a normal lung; lane 43 represents normal kidney; and lane 44 represents normal pancreas. Interexperimental comparison was facilitated by including a positive control RNA of known β -actin message abundance in each assay and normalizing the results of the different assays with respect to this positive control.

RT-PCR and Southern Blot analysis has shown the B18Ag1 locus to be present in human genomic DNA as a single copy endogenous retroviral element. A genomic clone of approximately 12-18 kb was isolated using the initial B18Ag1 sequence as a probe. Four additional subclones were also isolated by XbaI digestion. Additional retroviral sequences obtained from the ends of the XbaI digests of these clones (located as shown in Figure 4) are shown as SEQ ID NO:3 - SEQ ID NO:10, where SEQ ID NO:3 shows the location of the sequence labeled 10 in Figure 4, SEQ ID NO:4 shows the location of the sequence labeled 11-29, SEQ ID NO:5 shows the location of the sequence labeled 3, SEQ ID NO:6 shows the location of the sequence labeled 6, SEQ ID NO:7 shows the location of the sequence labeled 12, SEQ ID NO:8 shows the location of the sequence labeled 13, SEQ ID NO:9 shows the location of the sequence labeled 14 and SEQ ID NO:10 shows the location of the sequence labeled 11-22.

Subsequent studies demonstrated that the 12-18 kb genomic clone contains a retroviral element of about 7.75 kb, as shown in Figures 5A and 5B. The sequence of this retroviral element is shown in SEQ ID NO: 141. The numbered line at the top of Figure 5A represents the sense strand sequence of the retroviral genomic clone. The box below this line shows the position of selected restriction sites. The arrows depict the different overlapping clones used to sequence the retroviral element. The direction of the arrow shows whether the single-pass subclone sequence corresponded to the sense or anti-sense strand. Figure 5B is a schematic diagram of the retroviral element containing B18Ag1 depicting the organization of viral genes within the element. The open boxes correspond to predicted reading frames, starting with a methionine, found throughout the element. Each of the six likely reading frames is shown, as indicated to the left of the boxes, with frames 1-3 corresponding to those found on the sense strand.

Using the cDNA of SEQ ID NO:1 as a probe, a longer cDNA was obtained (SEQ ID NO:227) which contains minor nucleotide differences (less than 1%) compared to the genomic sequence shown in SEQ ID NO:141.

B. Preparation of cDNA Molecules Encoding Other Breast Tumor-Specific Polypeptides

Normal RNA and tumor RNA was prepared and mRNA was isolated and converted into cDNA using a (dT)₁₂AG anchored 3' primer, as described above. Differential display PCR was then executed using the randomly chosen primers of SEQ ID NO: 87-125. Amplification conditions were as noted above, and bands observed to be specific to the RNA fingerprint pattern of the tumor were cut out of a silver stained gel, subcloned into either the T-vector (Novagen, Madison, WI) or the pCRII vector (Invitrogen, San Diego, CA) and sequenced. The sequences are provided in SEQ ID NO:11 - SEQ ID NO:86. Of the 79 sequences isolated, 67 were found to be novel (SEQ ID NO:11-26 and 28-77) (*see also* Figures 6-20).

An extended DNA sequence (SEQ ID NO: 290) for the antigen B15Ag1 (originally identified partial sequence provided in SEQ ID NO: 27) was obtained in further studies. Comparison of the sequence of SEQ ID NO: 290 with those in the gene bank as described above, revealed homology to the known human β -A activin gene.

5 Further studies led to the isolation of a splice variant of B311D. The B311D clone of SEQ ID NO: 316 was sequenced and a XhoI/NotI fragment from this clone was gel purified and ³²P-cDTP labeled by random priming for use as a probe for further screening to obtain additional B311D gene sequence. Two fractions of a human breast tumor cDNA bacterial library were screened using standard techniques. One of the clones isolated in this manner yielded additional sequence which includes a poly A+ tail. 10 The determined cDNA sequence of this clone (referred to as B311D_BT1_1A) is provided in SEQ ID NO: 317. The sequences of SEQ ID NO: 316 and 317 were found to share identity over a 464 bp region, with the sequences diverging near the poly A+ sequence of SEQ ID NO: 317.

In further studies, several different splice forms of the antigen B11Ag1 (also referred to as B305D) were isolated, with each of the various splice forms containing slightly different versions of the B11Ag1 coding frame. Splice junction sequences define individual exons which, in various patterns and arrangements, make up the various splice forms. Primers were designed to examine the expression pattern of each of the exons using RT-PCR as described below. Each exon was found to show the same expression pattern as the original B11Ag1 clone, with expression being breast tumor-, normal prostate- and normal testis-specific. The determined cDNA sequences for the isolated protein coding exons are provided in SEQ ID NO: 292-298, respectively.

The predicted amino acid sequences corresponding to the sequences of SEQ ID NO: 292 and 298 are provided in SEQ ID NO: 299 and 300. Additional studies using rapid amplification of cDNA ends (RACE), a 5' specific primer to one of the splice forms of B11Ag1 provided above and a breast adenocarcinoma, led to the isolation of three additional, related, splice forms referred to as isoforms B11C-15, B11C-8 and B11C-9,16. The determined cDNA sequences for these isoforms are provided in SEQ ID NO: 301-303, with the corresponding predicted amino acid sequences being provided in SEQ ID NO: 304-306.

In subsequent studies on B305D isoform A (cDNA sequence provided in SEQ ID NO: 292), the cDNA sequence (provided in SEQ ID NO: 313) was found to contain an additional guanine residue at position 884, leading to a frameshift in the open reading frame. The determined DNA sequence of this ORF is provided in SEQ ID NO: 314. This frameshift generates a protein sequence (provided in SEQ ID NO: 315) of 293 amino acids that contains the C-terminal domain common to the other isoforms of B305D but that differs in the N-terminal region.

EXAMPLE 2

PREPARATION OF B18AG1 DNA FROM HUMAN GENOMIC DNA

This Example illustrates the preparation of B18Ag1 DNA by amplification from human genomic DNA.

B18Ag1 DNA may be prepared from 250 ng human genomic DNA using 20 pmol of B18Ag1 specific primers, 500 pmol dNTPS and 1 unit of *Taq* DNA polymerase (Perkin Elmer, Branchburg, NJ) using the following amplification parameters: 94°C for 30 seconds denaturing, 30 seconds 60°C to 42°C touchdown annealing in 2°C increments every two cycles and 72°C extension for 30 seconds. The last increment (a 42°C annealing temperature) should cycle 25 times. Primers were selected using computer analysis. Primers synthesized were B18Ag1-1, B18Ag1-2, B18Ag1-3, and B18Ag1-4. Primer pairs that may be used are 1+3, 1+4, 2+3, and 2+4.

Following gel electrophoresis, the band corresponding to B18Ag1 DNA may be excised and cloned into a suitable vector.

EXAMPLE 3

5 PREPARATION OF B18AG1 DNA FROM BREAST TUMOR cDNA

This Example illustrates the preparation of B18Ag1 DNA by amplification from human breast tumor cDNA.

First strand cDNA is synthesized from RNA prepared from human breast
10 tumor tissue in a reaction mixture containing 500 ng poly A⁺ RNA, 200 pmol of the primer (T)₁₂AG (*i.e.*, TTT TTT TTT TTT AG) (SEQ ID NO: 130), 1X first strand reverse transcriptase buffer, 6.7 mM DTT, 500 mmol dNTPs, and 1 unit AMV or MMLV reverse transcriptase (from any supplier, such as Gibco-BRL (Grand Island, NY)) in a final volume of 30 μ l. After first strand synthesis, the cDNA is diluted approximately 25
15 fold and 1 μ l is used for amplification as described in Example 2. While some primer pairs can result in a heterogeneous population of transcripts, the primers B18Ag1-2 (5'ATG GCT ATT TTC GGG GGC TGA CA) (SEQ ID NO: 126) and B18Ag1-3 (5'CCG GTA TCT CCT CGT GGG TAT T) (SEQ ID NO: 127) yield a single 151 bp amplification product.

20

EXAMPLE 4

IDENTIFICATION OF B-CELL AND T-CELL EPITOPES OF B18AG1

This Example illustrates the identification of B18Ag1 epitopes.

25 The B18Ag1 sequence can be screened using a variety of computer algorithms. To determine B-cell epitopes, the sequence can be screened for hydrophobicity and hydrophilicity values using the method of Hopp, *Prog. Clin. Biol. Res.* 172B:367-77 (1985) or, alternatively, Cease et al., *J. Exp. Med.* 164:1779-84 (1986) or Spouge et al., *J. Immunol.* 138:204-12 (1987). Additional Class II MHC (antibody or
30 B-cell) epitopes can be predicted using programs such as AMPHI (*e.g.*, Margalit et al., *J.*

Immunol. 138:2213 (1987)) or the methods of Rothbard and Taylor (e.g., *EMBO J.* 7:93 (1988)).

Once peptides (15-20 amino acids long) are identified using these techniques, individual peptides can be synthesized using automated peptide synthesis equipment (available from manufacturers such as Perkin Elmer/Applied Biosystems Division, Foster City, CA) and techniques such as Merrifield synthesis. Following synthesis, the peptides can be used to screen sera harvested from either normal or breast cancer patients to determine whether patients with breast cancer possess antibodies reactive with the peptides. Presence of such antibodies in breast cancer patient would confirm the immunogenicity of the specific B-cell epitope in question. The peptides can also be tested for their ability to generate a serologic or humoral immune response in animals (mice, rats, rabbits, chimps etc.) following immunization *in vivo*. Generation of a peptide-specific antiserum following such immunization further confirms the immunogenicity of the specific B-cell epitope in question.

To identify T-cell epitopes, the B18Ag1 sequence can be screened using different computer algorithms which are useful in identifying 8-10 amino acid motifs within the B18Ag1 sequence which are capable of binding to HLA Class I MHC molecules. (see, e.g., Rammensee et al., *Immunogenetics* 41:178-228 (1995)). Following synthesis such peptides can be tested for their ability to bind to class I MHC using standard binding assays (e.g., Sette et al., *J. Immunol.* 153:5586-92 (1994)) and more importantly can be tested for their ability to generate antigen reactive cytotoxic T-cells following *in vitro* stimulation of patient or normal peripheral mononuclear cells using, for example, the methods of Bakker et al., *Cancer Res.* 55:5330-34 (1995); Visseren et al., *J. Immunol.* 154:3991-98 (1995); Kawakami et al., *J. Immunol.* 154:3961-68 (1995); and Kast et al., *J. Immunol.* 152:3904-12 (1994). Successful *in vitro* generation of T-cells capable of killing autologous (bearing the same Class I MHC molecules) tumor cells following *in vitro* peptide stimulation further confirms the immunogenicity of the B18Ag1 antigen. Furthermore, such peptides may be used to generate murine peptide and B18Ag1 reactive cytotoxic T-cells following *in vivo* immunization in mice rendered

transgenic for expression of a particular human MHC Class I haplotype (Vitiello et al., *J. Exp. Med.* 173:1007-15 (1991)).

A representative list of predicted B18Ag1 B-cell and T-cell epitopes, broken down according to predicted HLA Class I MHC binding antigen, is shown below:

Predicted Th Motifs (B-cell epitopes) (SEQ ID NOS.: 131-133)

SSGGRTFDDFHRVLLVG
QGAAQKPINLSKXIEVVQGHDE
SPGVFLEHLQEAYRIYTPFDLSA

Predicted HLA A2.1 Motifs (T-cell epitopes) (SEQ ID NOS.: 134-140)

YLLVGIQGA
GAAQKPINL
NLSKXIEVV
EYVQGHDES
HLQEAYRIY
NLAQVAQAA
FVAQAAPDS

EXAMPLE 5

IDENTIFICATION OF T-CELL EPITOPES OF B11Ag1

This Example illustrates the identification of B11Ag1 (also referred to as B305D) epitopes. Four peptides, referred to as B11-8, B11-1, B11-5 and B11-12 (SEQ ID NO: 309-312, respectfully) were derived from the B11Ag1 gene.

Human CD8 T cells were primed *in vitro* to the peptide B11-8 using dendritic cells according to the protocol of Van Tsai et al. (*Critical Reviews in Immunology* 18:65-75, 1998). The resulting CD8 T cell cultures were tested for their ability to recognize the B11-8 peptide or a negative control peptide, presented by the B-LCL line, JY. Briefly, T cells were incubated with autologous monocytes in the presence of 10 ug/ml peptide, 10 ng/ml IL-7 and 10 ug/ml IL-2, and assayed for their ability to

specifically lyse target cells in a standard 51-Cr release assay. As shown in Fig. 22, the bulk culture line demonstrated strong recognition of the B11-8 peptide with weaker recognition of the peptide B11-1.

A clone from this CTL line was isolated following rapid expansion using the monoclonal antibody OKT3 and human IL-2. As shown in Fig. 23, this clone (referred to as A1), in addition to being able to recognize specific peptide, recognized JY LCL transduced with the B11Ag1 gene. This data demonstrates that B11-8 is a naturally processed epitope of the B11Ag1 gene. In addition these T cells were further found to recognize and lyse, in an HLA-A2 restricted manner, an established tumor cell line naturally expressing B11Ag1 (Fig. 24). The T cells strongly recognize a lung adenocarcinoma (LT-140-22) naturally expressing B11Ag1 transduced with HLA-A2, as well as an A2+ breast carcinoma (CAMA-1) transduced with B11Ag1, but not untransduced lines or another negative tumor line (SW620).

These data clearly demonstrate that these human T cells recognize not only B11-specific peptides but also transduced cells, as well as naturally expressing tumor lines.

CTL lines raised against the antigens B11-5 and B11-12, using the procedures described above, were found to recognize corresponding peptide-coated targets.

Example 6

CHARACTERIZATION OF BREAST TUMOR GENES DISCOVERED BY
DIFFERENTIAL DISPLAY PCR

5 The specificity and sensitivity of the breast tumor genes discovered by differential display PCR were determined using RT-PCR. This procedure enabled the rapid evaluation of breast tumor gene mRNA expression semiquantitatively without using large amounts of RNA. Using gene specific primers, mRNA expression levels in a variety of tissues were examined, including 8 breast tumors, 5 normal breasts, 2 prostate
10 tumors, 2 colon tumors, 1 lung tumor, and 14 other normal adult human tissues, including normal prostate, colon, kidney, liver, lung, ovary, pancreas, skeletal muscle, skin, stomach and testes.

To ensure the semiquantitative nature of the RT-PCR, β -actin was used as internal control for each of the tissues examined. Serial dilutions of the first strand
15 cDNAs were prepared and RT-PCR assays performed using β -actin specific primers. A dilution was then selected that enabled the linear range amplification of β -actin template, and which was sensitive enough to reflect the difference in the initial copy number. Using this condition, the β -actin levels were determined for each reverse transcription reaction from each tissue. DNA contamination was minimized by DNase treatment and
20 by assuring a negative result when using first strand cDNA that was prepared without adding reverse transcriptase.

Using gene specific primers, the mRNA expression levels were determined in a variety of tissues. To date, 38 genes have been successfully examined by RT-PCR, five of which exhibit good specificity and sensitivity for breast tumors
25 (B15AG-1, B31GA1b, B38GA2a, B11A1a and B18AG1a). Figures 21A and 21B depict the results for three of these genes: B15AG-1 (SEQ ID NO:27), B31GA1b (SEQ ID NO:148) and B38GA2a (SEQ ID NO. 157). Table I summarizes the expression level of all the genes tested in normal breast tissue and breast tumors, and also in other tissues.

TABLE I

Percentage of Breast Cancer Antigens that are Expressed in Various Tissues

5	Breast Tissues	Over-expressed in Breast Tumors	84%
		Equally Expressed in Normals and Tumor	16%
10	Other Tissues	Over-expressed in Breast Tumors but not in any Normal Tissues	9%
		Over-expressed in Breast Tumors but Expressed in Some Normal Tissues	30%
15		Over-expressed in Breast Tumors but Equally Expressed in All Other Tissues	61%

20 From the foregoing, it will be appreciated that, although specific embodiments of the invention have been described herein for the purpose of illustration, various modifications may be made without deviating from the spirit and scope of the invention.

CLAIMS

1. An isolated polypeptide, comprising at least an immunogenic portion of a protein, or a variant thereof, wherein the protein comprises an amino acid sequence that is encoded by a polynucleotide sequence selected from the group consisting of:

(a) sequences recited in SEQ ID NOs: 1, 3-26, 28-77, 142, 143, 146-152, 154-166, 168-176, 178-192, 194-198, 200-204, 206, 207, 209-214, 216, 218, 219, 221-240, 243-245, 247, 250, 251, 253, 255, 257-266, 268, 269, 271-273, 275, 276, 278, 280, 281, 284, 288, 291-298, 301-303, 307, 313, 314, 316 and 317;

(b) sequences that hybridize to a sequence recited in any one of SEQ ID NOs: 1, 3-26, 28-77, 142, 143, 146-152, 154-166, 168-176, 178-192, 194-198, 200-204, 206, 207, 209-214, 216, 218, 219, 221-240, 243-245, 247, 250, 251, 253, 255, 257-266, 268, 269, 271-273, 275, 276, 278, 280, 281, 284, 288, 291-298, 301-303, 307, 313, 314, 316 and 317 under moderately stringent conditions; and

(c) complements of sequences of (a) or (b).

2. An isolated polypeptide according to claim 1, wherein the polypeptide comprises an amino acid sequence that is encoded by a polynucleotide sequence recited in any one of SEQ ID NOs: 1, 3-26, 28-77, 142, 143, 146-152, 154-166, 168-176, 178-192, 194-198, 200-204, 206, 207, 209-214, 216, 218, 219, 221-240, 243-245, 247, 250, 251, 253, 255, 257-266, 268, 269, 271-273, 275, 276, 278, 280, 281, 284, 288, 291-298, 301-303, 307, 313, 314, 316 and 317 or a complement of any of the foregoing polynucleotide sequences.

3. An isolated polypeptide comprising a sequence recited in any one of SEQ ID NOs: 299, 300, 304-306, 308 and 315.

4. An isolated polynucleotide encoding at least 15 amino acid

residues of a protein, or a variant thereof that differs in one or more substitutions, deletions, additions and/or insertions such that the ability of the variant to react with antigen-specific antisera is not substantially diminished, wherein the tumor protein comprises an amino acid sequence that is encoded by a polynucleotide comprising a sequence recited in any one of SEQ ID NOs: 1, 3-26, 28-77, 142, 143, 146-152, 154-166, 168-176, 178-192, 194-198, 200-204, 206, 207, 209-214, 216, 218, 219, 221-240, 243-245, 247, 250, 251, 253, 255, 257-266, 268, 269, 271-273, 275, 276, 278, 280, 281, 284, 288, 291-298, 301-303, 307, 313, 314, 316 and 317 or a complement of any of the foregoing sequences.

10

5. An isolated polynucleotide encoding a protein, or a variant thereof, wherein the tumor protein comprises an amino acid sequence that is encoded by a polynucleotide comprising a sequence recited in any one of SEQ ID NOs: 1, 3-26, 28-77, 142, 143, 146-152, 154-166, 168-176, 178-192, 194-198, 200-204, 206, 207, 209-214, 216, 218, 219, 221-240, 243-245, 247, 250, 251, 253, 255, 257-266, 268, 269, 271-273, 275, 276, 278, 280, 281, 284, 288, 291-298, 301-303, 307, 313, 314, 316 and 317 or a complement of any of the foregoing sequences.

6. An isolated polynucleotide, comprising a sequence recited in any one of SEQ ID Nos: 1, 3-26, 28-77, 142, 143, 146-152, 154-166, 168-176, 178-192, 194-198, 200-204, 206, 207, 209-214, 216, 218, 219, 221-240, 243-245, 247, 250, 251, 253, 255, 257-266, 268, 269, 271-273, 275, 276, 278, 280, 281, 284, 288, 291-298, 301-303, 307, 313, 314, 316 and 317.

7. An isolated polynucleotide, comprising a sequence that hybridizes to a sequence recited in any one of SEQ ID NOs: 1, 3-26, 28-77, 142, 143, 146-152, 154-166, 168-176, 178-192, 194-198, 200-204, 206, 207, 209-214, 216, 218, 219, 221-240, 243-245, 247, 250, 251, 253, 255, 257-266, 268, 269, 271-273, 275, 276, 278, 280, 281, 284, 288, 291-298, 301-303, 307, 313, 314, 316 and 317 under moderately stringent conditions.

8. An isolated polynucleotide complementary to a polynucleotide according to any one of claims 4-7.

9. An expression vector, comprising a polynucleotide according to any one of claims claim 4-8.

10. A host cell transformed or transfected with an expression vector according to claim 9.

11. An isolated antibody, or antigen-binding fragment thereof, that specifically binds to a protein that comprises an amino acid sequence that is encoded by a polynucleotide sequence recited in any one of SEQ ID NOs: 1, 3-26, 28-77, 142, 143, 146-152, 154-166, 168-176, 178-192, 194-198, 200-204, 206, 207, 209-214, 216, 218, 219, 221-240, 243-245, 247, 250, 251, 253, 255, 257-266, 268, 269, 271-273, 275, 276, 278, 280, 281, 284, 288, 291-298, 301-303, 307, 313, 314, 316 and 317 or a complement of any of the foregoing polynucleotide sequences.

12. A fusion protein, comprising at least one polypeptide according to claim 1.

13. A fusion protein according to claim 12, wherein the fusion protein comprises an expression enhancer that increases expression of the fusion protein in a host cell transfected with a polynucleotide encoding the fusion protein.

14. A fusion protein according to claim 12, wherein the fusion protein comprises a T helper epitope that is not present within the polypeptide of claim 1.

15. A fusion protein according to claim 12, wherein the fusion protein comprises an affinity tag.

16. An isolated polynucleotide encoding a fusion protein according to claim 12.

17. A pharmaceutical composition, comprising a physiologically acceptable carrier and at least one component selected from the group consisting of:

- (a) a polypeptide according to claim 1;
- (b) a polynucleotide according to claim 4;
- (c) an antibody according to claim 11;
- (d) a fusion protein according to claim 12; and
- (e) a polynucleotide according to claim 16.

18. A vaccine comprising an immunostimulant and at least one component selected from the group consisting of:

- (a) a polypeptide according to claim 1;
- (b) a polynucleotide according to claim 4;
- (c) an antibody according to claim 11;
- (d) a fusion protein according to claim 12; and
- (e) a polynucleotide according to claim 16.

19. A vaccine according to claim 18, wherein the immunostimulant is an adjuvant.

20. A vaccine according to any claim 18, wherein the immunostimulant induces a predominantly Type I response.

21. A method for inhibiting the development of a cancer in a patient, comprising administering to a patient an effective amount of a pharmaceutical composition according to claim 17.

22. A method for inhibiting the development of a cancer in a patient, comprising administering to a patient an effective amount of a vaccine according to

claim 18.

23. A pharmaceutical composition comprising an antigen-presenting cell that expresses a polypeptide according to claim 1, in combination with a pharmaceutically acceptable carrier or excipient.

24. A pharmaceutical composition according to claim 23, wherein the antigen presenting cell is a dendritic cell or a macrophage.

25. A vaccine comprising an antigen-presenting cell that expresses a polypeptide comprising at least an immunogenic portion of a protein, or a variant thereof, wherein the protein comprises an amino acid sequence that is encoded by a polynucleotide sequence selected from the group consisting of:

(a) sequences recited in SEQ ID NOs: 1, 3-26, 28-86, 142-253, 255-298, 301-303, 307, 313, 314, 316 and 317;

(b) sequences that hybridize to a sequence recited in any one of SEQ ID NOs: 1, 3-26, 28-86, 142-253, 255-298, 301-303, 307, 313, 314, 316 and 317 under moderately stringent conditions; and

(c) complements of sequences of (i) or (ii);
in combination with an immunostimulant.

26. A vaccine according to claim 25, wherein the immunostimulant is an adjuvant.

27. A vaccine according to claim 25, wherein the immunostimulant induces a predominantly Type I response.

28. A vaccine according to claim 25, wherein the antigen-presenting cell is a dendritic cell.

29. A method for inhibiting the development of a cancer in a patient,

comprising administering to a patient an effective amount of an antigen-presenting cell that expresses a polypeptide comprising at least an immunogenic portion of a protein, or a variant thereof, wherein the protein comprises an amino acid sequence that is encoded by a polynucleotide sequence selected from the group consisting of:

5 (a) sequences recited in SEQ ID NOs: 1, 3-26, 28-86, 142-253, 255-298, 301-303, 307, 313, 314, 316 and 317;

(b) sequences that hybridize to a sequence recited in any one of SEQ ID NOs: 1, 3-26, 28-86, 142-253, 255-298, 301-303, 307, 313, 314, 316 and 317 under moderately stringent conditions; and

10 (c) complements of sequences encoded by a polynucleotide recited in any one of SEQ ID NOs: 1, 3-26, 28-86, 142-253, 255-298, 301-303, 307, 313, 314, 316 and 317;

and thereby inhibiting the development of a cancer in the patient.

15 30. A method according to claim 29, wherein the antigen-presenting cell is a dendritic cell.

31. A method according to any one of claims 21, 22 and 29, wherein the cancer is breast cancer.

20 32. A method for removing tumor cells from a biological sample, comprising contacting a biological sample with T cells that specifically react with a protein, wherein the protein comprises an amino acid sequence that is encoded by a polynucleotide sequence selected from the group consisting of:

25 (i) polynucleotides recited in any one of SEQ ID NOs: 1, 3-26, 28-86, 142-253, 255-298, 301-303, 307, 313, 314, 316 and 317; and

(ii) complements of the foregoing polynucleotides;

wherein the step of contacting is performed under conditions and for a time sufficient to permit the removal of cells expressing the antigen from the sample.

30

33. A method according to claim 32, wherein the biological sample is

blood or a fraction thereof.

34. A method for inhibiting the development of a cancer in a patient, comprising administering to a patient a biological sample treated according to the
5 method of claim 32.

35. A method for stimulating and/or expanding T cells specific for a protein, comprising contacting T cells with at least one component selected from the group consisting of:

10 (a) polypeptides comprising at least an immunogenic portion of a protein, or a variant thereof, wherein the protein comprises an amino acid sequence that is encoded by a polynucleotide sequence selected from the group consisting of:

(i) sequences recited in SEQ ID NOs: 1, 3-26, 28-86, 142-253, 255-298, 301-303, 307, 313, 314, 316 and 317;

15 (ii) sequences that hybridize to a sequence recited in any one of SEQ ID NOs: 1, 3-26, 28-86, 142-253, 255-298, 301-303, 307, 313, 314, 316 and 317 under moderately stringent conditions; and

(iii) complements of sequences of (i) or (ii);

(b) polynucleotides encoding a polypeptide of (a); and

20 (c) antigen presenting cells that express a polypeptide of (a);

under conditions and for a time sufficient to permit the stimulation and/or expansion of T cells.

36. An isolated T cell population, comprising T cells prepared
25 according to the method of claim 35.

37. A method for inhibiting the development of a cancer in a patient, comprising administering to a patient an effective amount of a T cell population according to claim 36.

30

38. A method for inhibiting the development of a cancer in a patient,

comprising the steps of:

(a) incubating CD4⁺ and/or CD8⁺ T cells isolated from a patient with at least one component selected from the group consisting of:

(i) polypeptides comprising at least an immunogenic portion of a protein, or a variant thereof, wherein the protein comprises an amino acid sequence that is encoded by a polynucleotide sequence selected from the group consisting of:

(1) sequences recited in SEQ ID NOs: 1, 3-26, 28-86, 142-253, 255-298, 301-303, 307, 313, 314, 316 and 317;

(2) sequences that hybridize to a sequence recited in any one of SEQ ID NOs: 1, 3-26, 28-86, 142-253, 255-298, 301-303, 307, 313, 314, 316 and 317 under moderately stringent conditions; and

(3) complements of sequences of (1) or (2);

(ii) polynucleotides encoding a polypeptide of (i); and

(iii) antigen presenting cells that expresses a polypeptide of (i);

such that T cells proliferate; and

(b) administering to the patient an effective amount of the proliferated T cells, and thereby inhibiting the development of a cancer in the patient.

39. A method for inhibiting the development of a cancer in a patient, comprising the steps of:

(a) incubating CD4⁺ and/or CD8⁺ T cells isolated from a patient with at least one component selected from the group consisting of:

(i) polypeptides comprising at least an immunogenic portion of a protein, or a variant thereof, wherein the protein comprises an amino acid sequence that is encoded by a polynucleotide sequence selected from the group consisting of:

(1) sequences recited in SEQ ID NOs: 1, 3-26, 28-86, 142-253, 255-298, 301-303, 307, 313, 314, 316 and 317;

(2) sequences that hybridize to a sequence recited in

any one of SEQ ID NOs: 1, 3-26, 28-86, 142-253, 255-298, 301-303, 307, 313, 314, 316 and 317 under moderately stringent conditions; and

(3) complements of sequences of (1) or (2);

(ii) polynucleotides encoding a polypeptide of (i); and

(iii) antigen presenting cells that express a polypeptide

of (i);

such that T cells proliferate;

(b) cloning at least one proliferated cell to provide cloned T cells;

and

(c) administering to the patient an effective amount of the cloned T cells, and thereby inhibiting the development of a cancer in the patient.

40. A method for determining the presence or absence of a cancer in a patient, comprising the steps of:

(a) contacting a biological sample obtained from a patient with a binding agent that binds to a protein, wherein the protein comprises an amino acid sequence that is encoded by a polynucleotide sequence recited in any one of SEQ ID NOs: 1, 3-26, 28-86, 142-253, 255-298, 301-303, 307, 313, 314, 316 and 317 or a complement of any of the foregoing polynucleotide sequences;

(b) detecting in the sample an amount of polypeptide that binds to the binding agent; and

(c) comparing the amount of polypeptide to a predetermined cut-off value, and therefrom determining the presence or absence of a cancer in the patient.

41. A method according to claim 40, wherein the binding agent is an antibody.

42. A method according to claim 43, wherein the antibody is a monoclonal antibody.

43. A method according to claim 40, wherein the cancer is breast

cancer.

44. A method for monitoring the progression of a cancer in a patient, comprising the steps of:

5 (a) contacting a biological sample obtained from a patient at a first point in time with a binding agent that binds to a protein, wherein the protein comprises an amino acid sequence that is encoded by a polynucleotide sequence recited in any one of SEQ ID NOs: 1, 3-26, 28-86, 142-253, 255-298, 301-303, 307, 313, 314, 316 and 317 or a complement of any of the foregoing polynucleotide sequences;

10 (b) detecting in the sample an amount of polypeptide that binds to the binding agent;

(c) repeating steps (a) and (b) using a biological sample obtained from the patient at a subsequent point in time; and

15 (d) comparing the amount of polypeptide detected in step (c) to the amount detected in step (b) and therefrom monitoring the progression of the cancer in the patient.

45. A method according to claim 44, wherein the binding agent is an antibody.

20 46. A method according to claim 45, wherein the antibody is a monoclonal antibody.

25 47. A method according to claim 44, wherein the cancer is a breast cancer.

48. A method for determining the presence or absence of a cancer in a patient, comprising the steps of:

30 (a) contacting a biological sample obtained from a patient with an oligonucleotide that hybridizes to a polynucleotide that encodes a protein, wherein the protein comprises an amino acid sequence that is encoded by a polynucleotide sequence

recited in any one of SEQ ID NO: 1, 3-26, 28-86, 142-253, 255-298, 301-303, 307, 313, 314, 316 and 317 or a complement of any of the foregoing polynucleotide sequences;

(b) detecting in the sample an amount of a polynucleotide that hybridizes to the oligonucleotide; and

5 (c) comparing the amount of polynucleotide that hybridizes to the oligonucleotide to a predetermined cut-off value, and therefrom determining the presence or absence of a cancer in the patient.

49. A method according to claim 48, wherein the amount of
10 polynucleotide that hybridizes to the oligonucleotide is determined using a polymerase chain reaction.

50. A method according to claim 48, wherein the amount of
15 polynucleotide that hybridizes to the oligonucleotide is determined using a hybridization assay.

51. A method for monitoring the progression of a cancer in a patient, comprising the steps of:

(a) contacting a biological sample obtained from a patient with an
20 oligonucleotide that hybridizes to a polynucleotide that encodes a protein, wherein the protein comprises an amino acid sequence that is encoded by a polynucleotide sequence recited in any one of SEQ ID NO: 1, 3-26, 28-86, 142-253, 255-298, 301-303, 307, 313, 314, 316 and 317 or a complement of any of the foregoing polynucleotide sequences;

(b) detecting in the sample an amount of a polynucleotide that
25 hybridizes to the oligonucleotide;

(c) repeating steps (a) and (b) using a biological sample obtained from the patient at a subsequent point in time; and

(d) comparing the amount of polynucleotide detected in step (c) to the amount detected in step (b) and therefrom monitoring the progression of the cancer
30 in the patient.

52. A method according to claim 51, wherein the amount of polynucleotide that hybridizes to the oligonucleotide is determined using a polymerase chain reaction.

5 53. A method according to claim 51, wherein the amount of polynucleotide that hybridizes to the oligonucleotide is determined using a hybridization assay.

54. A diagnostic kit, comprising:

- 10 (a) one or more antibodies according to claim 11; and
(b) a detection reagent comprising a reporter group.

55. A kit according to claim 54, wherein the antibodies are immobilized on a solid support.

15 56. A kit according to claim 54, wherein the detection reagent comprises an anti-immunoglobulin, protein G, protein A or lectin.

57. A kit according to claim 54, wherein the reporter group is
20 selected from the group consisting of radioisotopes, fluorescent groups, luminescent groups, enzymes, biotin and dye particles.

58. An oligonucleotide comprising 10 to 40 contiguous nucleotides that hybridize under moderately stringent conditions to a polynucleotide that encodes a
25 protein, wherein the protein comprises an amino acid sequence that is encoded by a polynucleotide sequence recited in any one of SEQ ID NOs: 1, 3-26, 28-77, 142, 143, 146-152, 154-166, 168-176, 178-192, 194-198, 200-204, 206, 207, 209-214, 216, 218, 219, 221-240, 243-245, 247, 250, 251, 253, 255, 257-266, 268, 269, 271-273, 275, 276, 278, 280, 281, 284, 288, 291-298, 301-303, 307, 313, 314, 316 and 317 or a
30 complement of any of the foregoing polynucleotides.

59. A oligonucleotide according to claim 58, wherein the oligonucleotide comprises 10-40 contiguous nucleotides recited in any one of SEQ ID Nos: 1, 3-26, 28-77, 142, 143, 146-152, 154-166, 168-176, 178-192, 194-198, 200-204, 206, 207, 209-214, 216, 218, 219, 221-240, 243-245, 247, 250, 251, 253, 255, 257-266, 268, 269, 271-273, 275, 276, 278, 280, 281, 284, 288, 291-298, 301-303, 307, 313, 314, 316 and 317.

60. A diagnostic kit, comprising:

(a) an oligonucleotide according to claim 59; and

10 (b) a diagnostic reagent for use in a polymerase chain reaction or hybridization assay.

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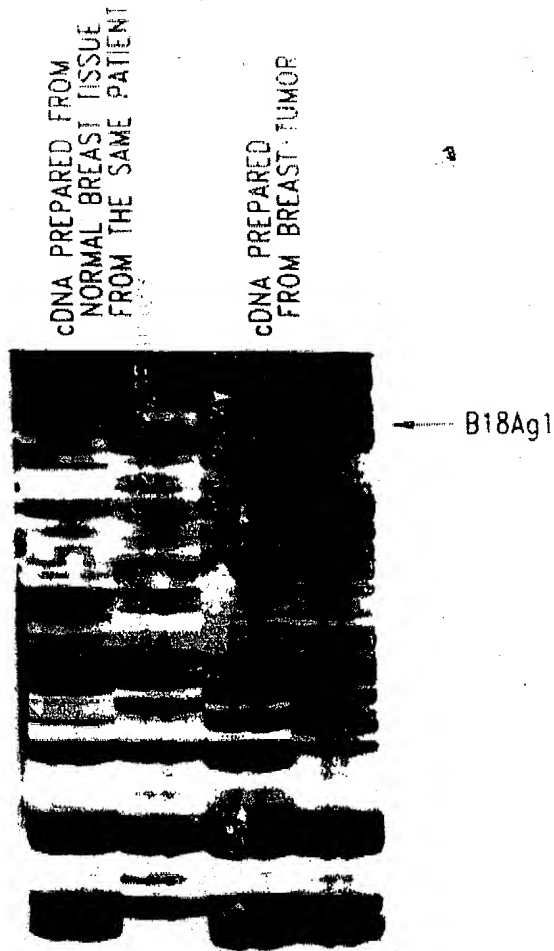


Fig. 1

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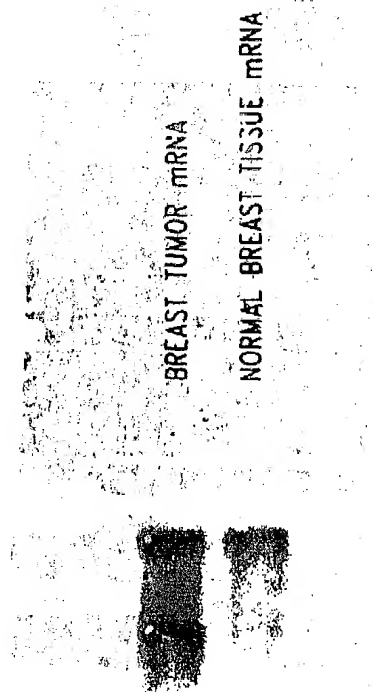


Fig. 2

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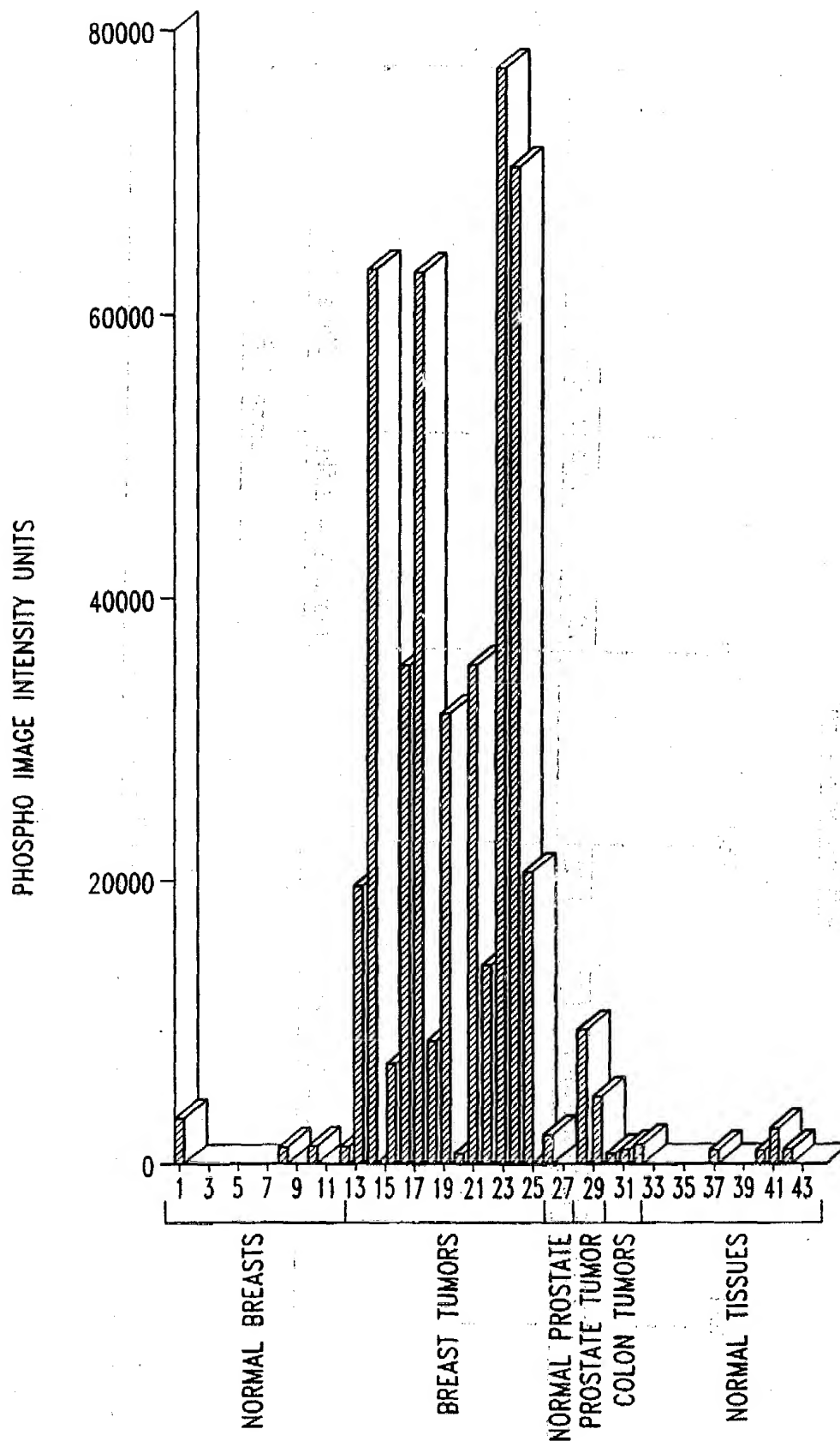


Fig. 3

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GENOMIC CLONE MAP

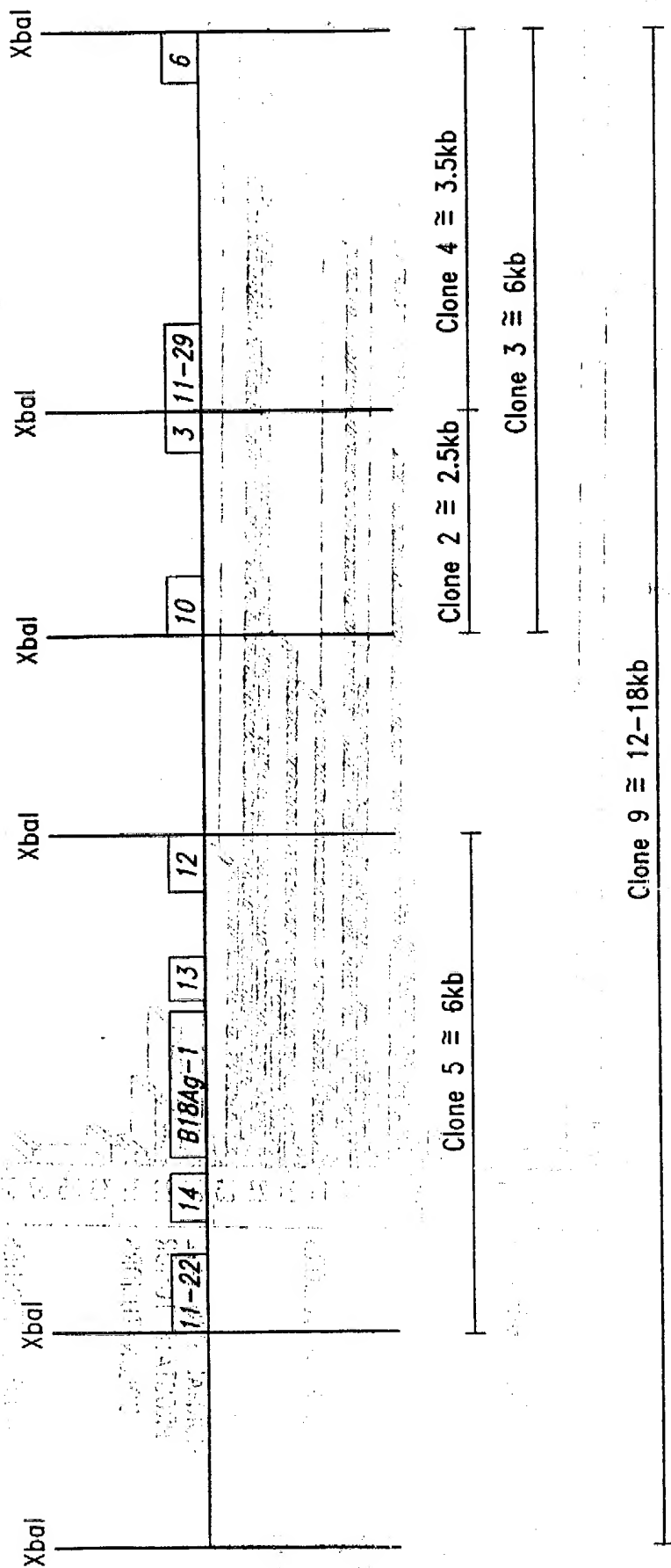


Fig. 4

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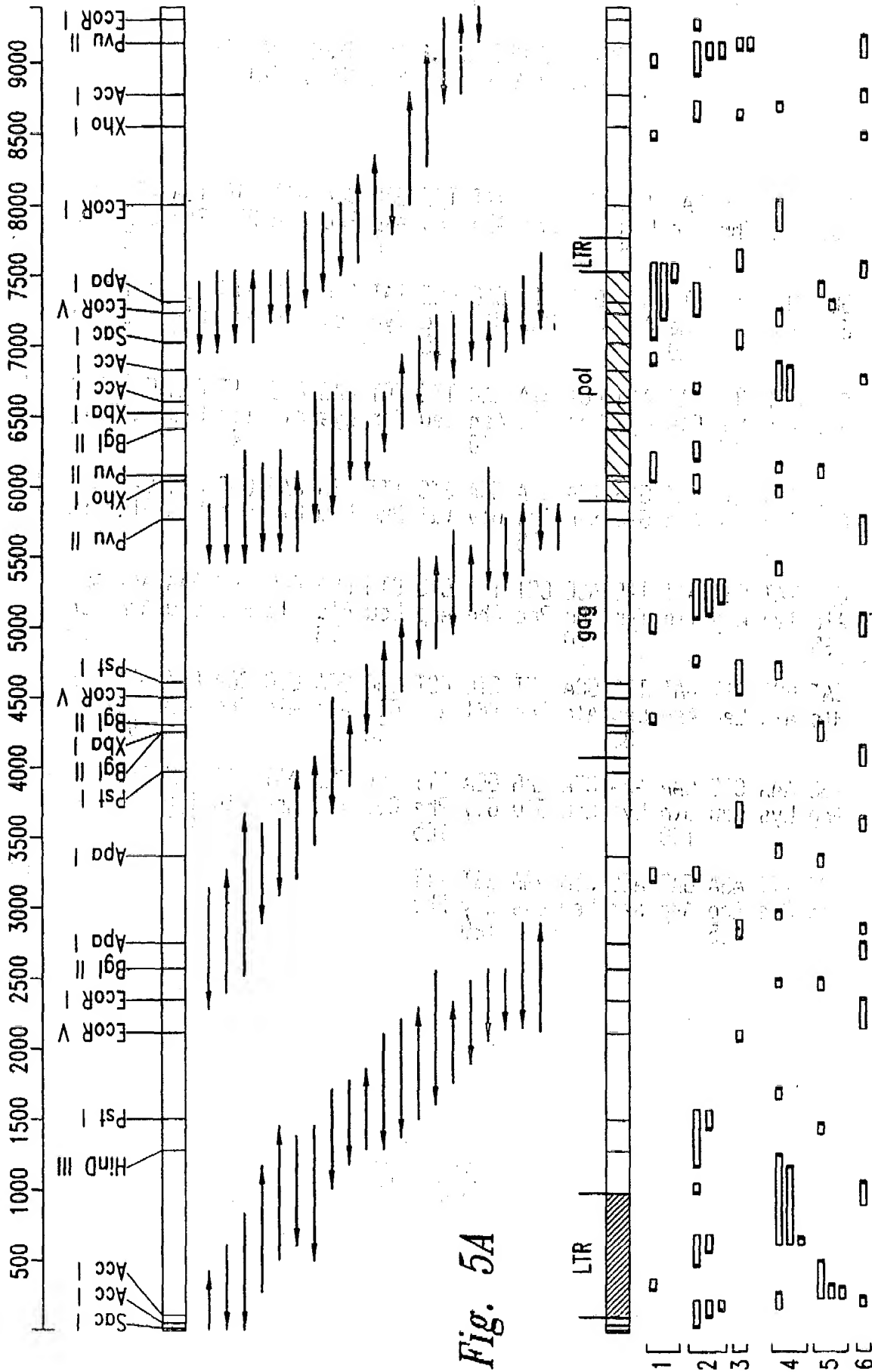


Fig. 5A

Fig. 5B

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NUCLEOTIDE SEQUENCE OF THE REPRESENTATIVE
BREAST-TUMOR SPECIFIC cDNA B18Ag1

TTA	GAG	ACC	CAA	TTG	GGA	CCT	AAT	TGG	GAC	CCA	AAT	TTC	TCA	AGT	GGA	48
Leu	Glu	Thr	Gln	Leu	Gly	Pro	Asn	Trp	Asp	Pro	Asn	Phe	Ser	Ser	Gly	
1				5				10						15		
GGG	AGA	ACT	TTT	GAC	GAT	TTC	CAC	CGG	TAT	CTC	CTC	GTG	GGT	ATT	CAG	96
Gly	Arg	Thr	Phe	Asp	Asp	Phe	His	Arg	Tyr	Leu	Leu	Val	Gly	Ile	Gln	
		20						25					30			
GGA	GCT	GCC	CAG	AAA	CCT	ATA	AAC	TTG	TCT	AAG	GCG	ATT	GAA	GTC	GTC	144
Gly	Ala	Ala	Gln	Lys	Pro	Ile	Asn	Leu	Ser	Lys	Ala	Ile	Glu	Val	Val	
		35					40					45				
CAG	GGG	CAT	GAT	GAG	TCA	CCA	GGA	GTG	TTT	TTA	GAG	CAC	CTC	CAG	GAG	192
Gln	Gly	His	Asp	Glu	Ser	Pro	Gly	Val	Phe	Leu	Glu	His	Leu	Gln	Glu	
	50					55					60					
GCT	TAT	CGG	ATT	TAC	ACC	CCT	TTT	GAC	CTG	GCA	GCC	CCC	GAA	AAT	AGC	240
Ala	Tyr	Arg	Ile	Tyr	Thr	Pro	Phe	Asp	Leu	Ala	Ala	Pro	Glu	Asn	Ser	
65					70					75					80	
CAT	GCT	CTT	AAT	TTG	GCA	TTT	GTG	GCT	CAG	GCA	GCC	CCA	GAT	AGT	AAA	288
His	Ala	Leu	Asn	Leu	Ala	Phe	Val	Ala	Gln	Ala	Ala	Pro	Asp	Ser	Lys	
			85					90						95		
AGG	AAA	CTC	CAA	AAA	CTA	GAG	GGA	TTT	TGC	TGG	AAT	GAA	TAC	CAG	TCA	336
Arg	Lys	Leu	Gln	Lys	Leu	Glu	Gly	Phe	Cys	Trp	Asn	Glu	Tyr	Gln	Ser	
		100					105						110			
GCT	TTT	AGA	GAT	AGC	CTA	AAA	GGT	TTT								363
Ala	Phe	Arg	Asp	Ser	Leu	Lys	Gly	Phe								
		115					120									

Fig. 6

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NUCLEOTIDE SEQUENCE OF THE REPRESENTATIVE
BREAST-TUMOR SPECIFIC cDNA B17Ag1

GC TGGGCACAGT GGCTCATACC TGTAATCCTG ACCGTTTCAG AGGCTCAGGT 60
CG CTTGAGCCCA AGATTTCAG ACTAGTCTGG GTAACATAGT GAGACCCTAT 120
AA AAATAAAAAA ATGAGCCTGG TGTAAGTGGCA CACACCAGCT GAGGAGGGAG 180
CT AGGAGA 196

Fig. 7

NUCLEOTIDE SEQUENCE OF THE REPRESENTATIVE
BREAST-TUMOR SPECIFIC cDNA B17Ag2

GC TTGGGGGGCTC TGACTAGAAA TTCAAGGAAC CTGGGATTCA AGTCCAAC TG	60
AC TTACACTGTG GNCTCCAATA AACTGCTTCT TTCCTATTCC CTCTCTATTA	120
AA GGAAAACGAT GTCTGTGTAT AGCCAAAGTCA GNTATCCTAA AAGGAGATAC	180
AT TAAATATCAG AATGTAAAAC CTGGGAACCA GGTTCCTCAGC CTGGGATTAA	240
CA AGAAGACTGA ACAGTACTAC TGTGAAAAGC CCGAAGNGGC AATATGTTCA	300
TT GAAGGATGGC TGGGAGAATG AATGCTCTGT CCCCAGTCC CAAGCTCACT	360
CT CCTTTATAGC CTAGGAGA	388

Fig. 8

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NUCLEOTIDE SEQUENCE OF THE REPRESENTATIVE
BREAST-TUMOR SPECIFIC cDNA B13Ag2c

GC CTATAATCAT GTTTCTCATT ATTTTCACAT TTTATTAACC AATTTCTGTT 60
AA AATATGAGGG AAATATATGA AACAGGGAGG CAATGTTTCA ATAATTGATC 120
TG ATTTCTACAT CAGATGCTCT TTCCTTTCTT GTTTATTTCC TTTTATTTC 180
GG TCGAATGTAA TAGCTTTGTT TCAAGAGAGA GTTTTGGCAG TTTCTGTAGC 240
CT GCTCATGTCT CCAGGCATCT ATTTGCACTT TAGGAGGTGT CGTGGGAGAC 300
CT ATTTTTTCCA TATTGGGCA ACTACTA 337

Fig. 9

10/25

NUCLEOTIDE SEQUENCE OF THE REPRESENTATIVE
BREAST-TUMOR SPECIFIC cDNA B13Ag1b

GC CATACAGTGC CTTTCCATTT ATTTAACCCC CACCTGAACG GCATAAACTG	60
GC TGGTGTTTTT TACTGTAAAC AATAAGGAGA CTTTGCTCTT CATTTAAACC	120
AT TTCATATTTT ACGCTCGAGG GTTTTTACCG GTTCCTTTTT ACACTCCTTA	180
TT TAAGTCGTTT GGAACAAGAT ATTTTTTCTT TCCTGGCAGC TTTTAACATT	240
TT TGTGCTGGG GGAAGTCTGG TCACTGTTTC TCACAGTTGC AAATCAAGGC	300
CC AAGAAAAAAA AATTTTTTTG TTTTATTGTA AACTGGACCG GATAAACGGT	360
CG GCTGCTGTAT ATAGTTTTAA ATGGTTTATT GCACCTCCTT AAGTTGCACT	420
GG GGGGNTTTTG NATAGAAAGT NTTTANTCAC ANAGTCACAG GGACTTTTNT	480
NA CTGAGCTAAA AAGGGCTGNT TTTCGGGTGG GGGCAGATGA AGGCTCACAG	540
TC TCTTAGAGGG GGGAACNCT A	571

Fig. 10

11/25

NUCLEOTIDE SEQUENCE OF THE REPRESENTATIVE
BREAST-TUMOR SPECIFIC cDNA B13Ag1a

TA ATAACTTAAA TATAITTTGA TCACCCACTG GGGTGATAAG ACAATAGATA 60
TT TCCAAAAAGC ATAAACCAA AGTATCATAC CAAACCAAAT TCATACTGCT 120
CC GCACTGAAAC TTCACCTTCT AACTGTCTAC CTAACCAAAT TCTACCCTTC 180
GG TCGTGCTCA CTACTCTTTT TTTTTTTTTT TTTNTTTTGG AGATGGAGTC 240
CA GCCCAGGGGT GGAGTACAAT GGCACAACCT CAGCTCACTG NAACCTCCGC 300
TT CATGAGATTC TCCTGNTTCA GCCTTCCCAG TAGCTGGGAC TACAGGTGTG 360
TG CCTGGNTAAT CTTTTTNGT TTTNGGGTAG AGATGGGGGT TTTACATGTT 420
TG GTNTCGAACT CCTGACCTCA AGTGATCCAC CCACCTCAGG CTCCCAAAGT 480
TA CAGACATGAG CCACTGNGCC CAGNCCTGGT GCATGCTCAC TTCTCTAGGC 540
548

Fig. 11

12/25

NUCLEOTIDE SEQUENCE OF THE REPRESENTATIVE
BREAST-TUMOR SPECIFIC cDNA B11Ag1

TG CACATGCAGA ATATTCTATC GGTACTTCAG CTATTACTCA TTTTGATGGC	60
AG CCTATCCTCA AGATGAGTAT TTAGAAAGAA TTGATTTAGC GATAGACCAA	120
GC ACTCTGACTA CACGAAATTG TTCAGATGTG ATGGATTTAT GACAGTTGAT	180
GA GATTATTAAG TGATTATTTT AAAGGGAATC CATTAAATCC AGAATATCTT	240
TC AAGATGATAT AGAAATAGAA CAGAAAGAGA CTACAAATGA AGATGTATCA	300
TA TTGAAGAGCC TATAGTAGAA AATGAATTAG CTGCATTTAT TAGCCTTACA	360
TT TTCCTGATGA ATCTTATATT CAGCCATCGA CATAGCATTG CCTGATGGGC	420
GA ATAATAGAAA CTGGGTGCGG GGCTATTGAT GAATTCATCC NCAGTAAATT	480
AC AAAATATAAC TCGATTGCAT TTGGATGATG GAATACTAAA TCTGGCAAAA	540
GG AGCTACTAGT AACCTCTCTT TTTGAGATGC AAAATTTTCT TTTAGGGTTT	600
CT ACTTTACGGA TATTGGAGCA TAACGGGA	638

Fig. 12

13/25

NUCLEOTIDE SEQUENCE OF THE REPRESENTATIVE
BREAST-TUMOR SPECIFIC cDNA B3CA3c

ACTGATGGAT GTCGCCGGAG GCGAGGGGCC TTATCTGATG CTCGGCTGCC TGTTGCTGAT 60
GTGCGCGGGC ATTGGGCTGT TTATCTCAA CACCGCCACG GCGGTGCTGA TGGCGCCTAT 120
TGCCTTAGCG GCGGCGAAGT CAATGGGCGT CTCACCCTAT CCTTTTGCCA TGGTGGTGGC 180
GATGGCGGGT TCGGCGGGCT TTATGACCGG GGTCTCCTCG CCGGTTAACA CCCTGGTGCT 240
TGGCCCTGGC AAGTACTCAT TTAGCGATTT TGTCAAATA GCGGTG 286

Fig. 13

14/25

NUCLEOTIDE SEQUENCE OF THE REPRESENTATIVE
BREAST-TUMOR SPECIFIC cDNA B9CG1

```

AG CAGCCCCTTC TTCTCAATTT CATCTGTCAC TACCCTGGTG TAGTATCTCA      60
CA TTTTATAGC CTCCTCCCTG GTCTGTCTTT TGATTTTCCT GCCTGTAATC      120
AC ATAAGTCAA GTAAACATTT CTAAAGTGTG GTTATGCTCA TGTCACCTCT      180
AA ATAGTTTCCA TTACCGTCTT AATAAAATTC GGATTTGTTC TTTNCTATTN      240
CA CCTATGACCG AA                                                  262

```

Fig. 14

15/25

NUCLEOTIDE SEQUENCE OF THE REPRESENTATIVE
BREAST-TUMOR SPECIFIC cDNA B9CG3

AG CAAAGCCAGT GGTTCGAGCT CTCTACTGTG TAAACTCCTA AACCAAGGCC 60
TA AATGGTGGCA GGATTTTAT TATAACATG TACCCATGCA AATTCCTAT 120
GA TATATTCTTC TACATTTAAA CAATAAAAAT AATCTATTTT TAAAAGCCTA 180
AG TTAGGTAAGA GTGTTTAATG AGAGGGTATA AGGTATAAAT CACCAGTCAA 240
TG CCTATGACCG A 261

Fig. 15

16/25

NUCLEOTIDE SEQUENCE OF THE REPRESENTATIVE
BREAST-TUMOR SPECIFIC cDNA B2CA2

GG GCATGGACGC AGACGCCTGA CGTTTGGCTG AAAATCTTTC ATTGATTCGT	60
AT AGGAAAATTC CCAAAGAGGG AATGTCCTGT TGCTCGCCAG TTTTNTGTT	120
GG ANAAGGCAAN GAGCTCTTCA GACTATTGGN ATTNTCGTTC GGTCTTCTGC	180
CG NCTTGCAANG ATCTTCAT	208

Fig. 16

17/25

NUCLEOTIDE SEQUENCE OF THE REPRESENTATIVE
BREAST-TUMOR SPECIFIC cDNA B3CA1

GG GCATGGACGC AGACGCCTGA CGTTTGGCTG AAAATCTTTC ATTGATTCTG 60
AT AGGAAAATTC CCAAAGAGGG AATGTCCTGT TGCTCGCCAG TTTTNTGTT 120
GG ANAAGGCAAN GAGCTCTTCA GACTATTGGN ATTNTCGTTC GGTCTTCTGC 180
CG NCTTGCNANG ATCTTCAT 208

Fig. 17

18/25

NUCLEOTIDE SEQUENCE OF THE REPRESENTATIVE
BREAST-TUMOR SPECIFIC cDNA B3CA2

GG GCATGGACGC AGACGCCTGA CGTTTGGCTG AAAATCTTTC ATTGATTCGT 60
AT AGGAAAATTC CCAAAGAGGG AATGTCCTGT TGCTCGCCAG TTTTNTGTT 120
GG ANAAGGCAAN GAGCTCTTCA GACTATTGGN ATTNTCGTTC GGTCTTCTGC 180
CG NCTTGCNANG ATCTTCAT 208

Fig. 18

19/25

NUCLEOTIDE SEQUENCE OF THE REPRESENTATIVE
BREAST-TUMOR SPECIFIC cDNA B3CA3

AG GGAGCAAGGA GAAGGCATGG AGAGGCTCAN GCTGGTCCTG GCCTACGACT 60

CT GTCGCCGGGG ATGGTGGAGA ACTGAAGCGG GACCTCCTCG AGGTCCTCCG 120

TC NCCGTCCAGG AGGAGGGTCT TTCCGTGGTC TNGGAGGAGC GGGGGGAGAA 180

TC ATGGTCNACA TCCC 204

Fig. 19

20/25

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NUCLEOTIDE SEQUENCE OF THE REPRESENTATIVE
BREAST-TUMOR SPECIFIC cDNA B4CA1

TC AGGAGCGGGT AGAGTGGCAC CATTGAGGGG ATATTCAAAA ATATTATTTT	60
TG ATAGTTGCTG AGTTTTCTT TGACCCATGA GTTATATTGG AGTTTATTTT	120
CC AATCGCATGG ACATGTTAGA CT TATTTTCT GTTAATGATT NCTATTTTTA	180
GA TTTGAGAAAT TGGTTNTTAT TATATCAATT TTTGGTATTT GTTGAGTTTG	240
GC TTAGTATGTG ACCA	264

Fig. 20

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BEST AVAILABLE COPY

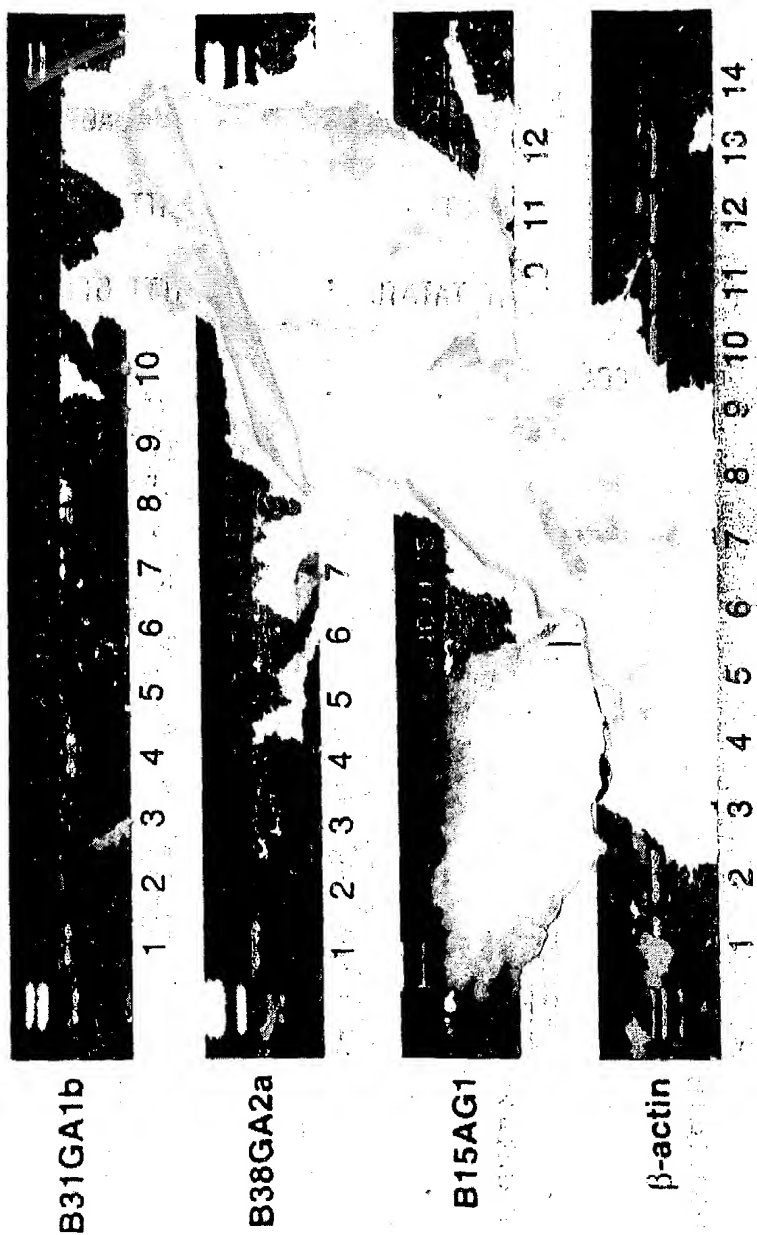


Fig. 21A

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BEST AVAILABLE COPY

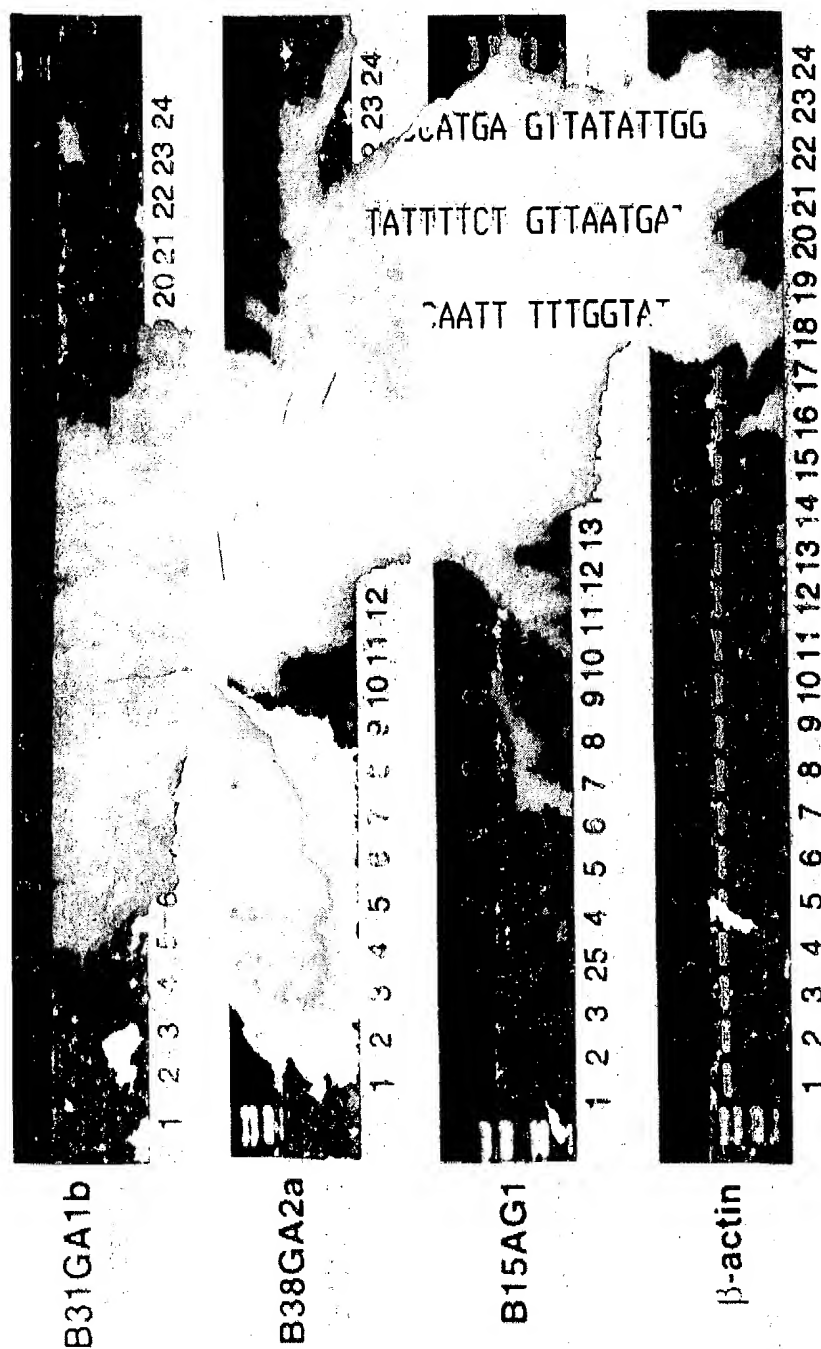
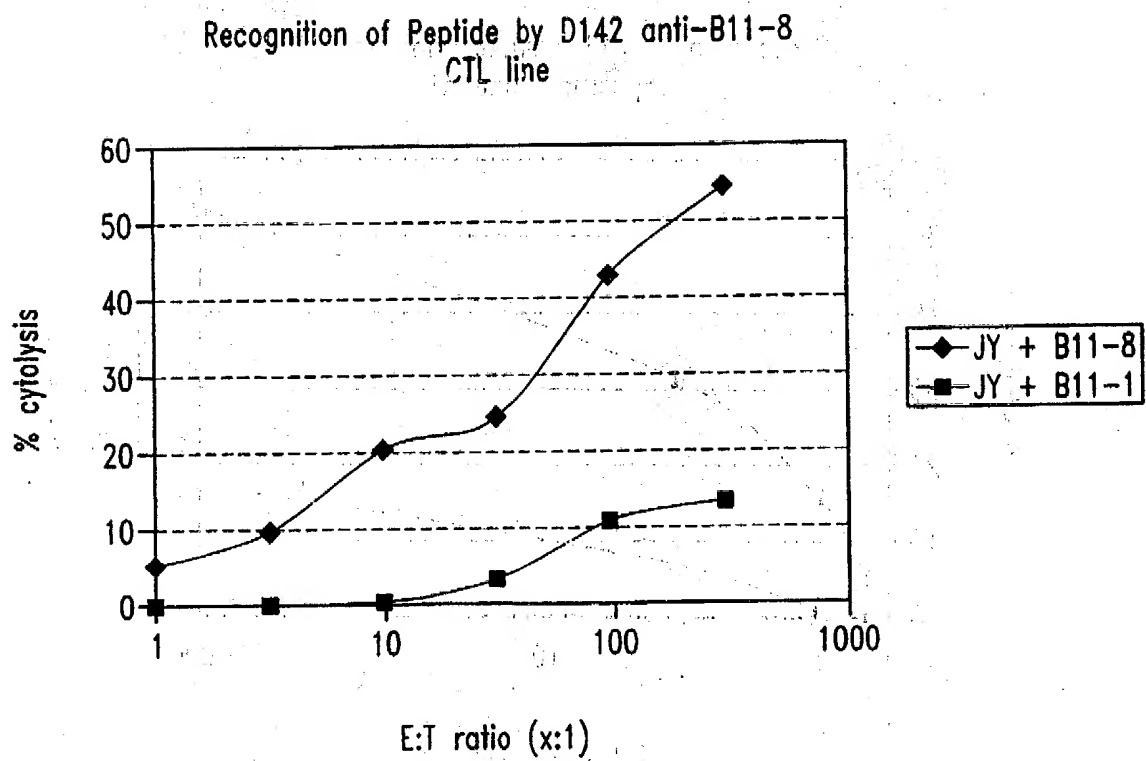


Fig. 21B

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*Fig. 22*

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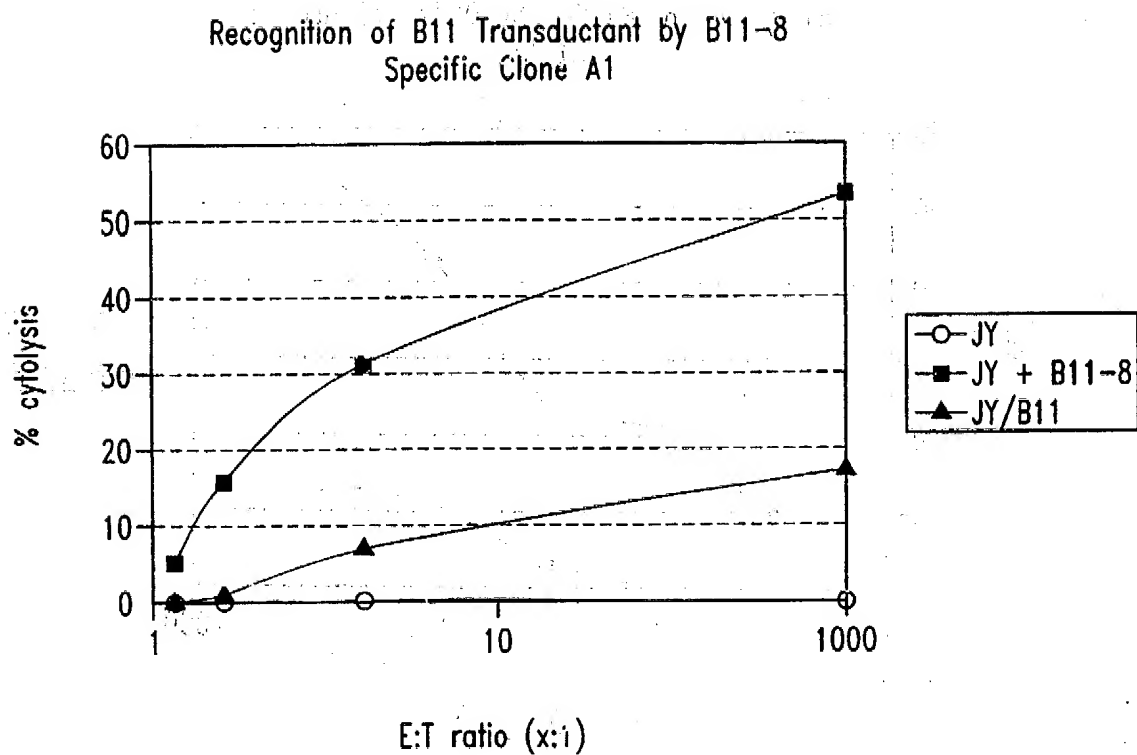
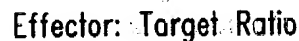


Fig. 23

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<211> 121

<212> PRT

<213> Homo sapien

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20 25 30	
Gly Ala Ala Gln Lys Pro Ile Asn Leu Ser Lys Ala Ile Glu Val Val	
35 40 45	
Gln Gly His Asp Glu Ser Pro Gly Val Phe Leu Glu His Leu Gln Glu	
50 55 60	
Ala Tyr Arg Ile Tyr Thr Pro Phe Asp Leu Ala Ala Pro Glu Asn Ser	
65 70 75 80	
His Ala Leu Asn Leu Ala Phe Val Ala Gln Ala Ala Pro Asp Ser Lys	
85 90 95	
Arg Lys Leu Gln Lys Leu Glu Gly Phe Cys Trp Asn Glu Tyr Gln Ser	
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Ala Phe Arg Asp Ser Leu Lys Gly Phe	
115 120	

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caccatttta	ggaggagcaa	agctacctca	gtccctccgg	agccgtttta	agatccccca	120
tcttcaaagc	ctaacagatc	aagcagctct	ccgggtgcaca	acctgcgccc	aggtaaattgc	180
caaaaaaggt	cctaaaccca	gcccaggcca	ccgtctccaa	gaaaactcac	caggagaaaa	240
gtgggaaatt	gactttacag	aagtaaaacc	acaccggggt	gggtacaaat	accttctagt	300
actggtagac	acctttctctg	gatggactga	agcatttgct	acaaaaaag	aaactgtcaa	360
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atgaaactga	ccctaaaaaa	acactcttac	aaaattaatc	ttaaaaacg	gtgttaattg	600
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gccattttg	caaaaatttc	ncaactaatt	tnacgtncc	tacgtctccc	caacagggtan	780
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ttcttcccc	agttaactnt	ttttnttaa	aattcccaaa	aaangaacm	cctgctggaa	900
aaacncccc	ctccaanccc	cggcnaagn	ggaaggttcc	cttgaatccc	nccccncna	960
anggccggga	accnttaaan	tngttccngg	gggtnnngcc	taaaagnccn	atttggtaaa	1020
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tttccatcat	tttaaggggt	taaaatcatc	ttgttcagac	ctcagcatat	aaaatgaccc	180
atctgtagac	ctcaggctcc	aaccataccc	caagagttgt	ctggttttgt	ttaaattact	240
gccaggtttc	agctgcagat	atccctggaa	ggaatattcc	agattccctg	agtagtttcc	300
aggttaaaat	cctataggct	tcttctgttt	tgaggaagag	ttcctgtcag	agaaaaacat	360
gattttggat	ttttaacttt	aatgcttgtg	aaacgctata	aaaaaaattt	tctaccoccta	420
gctttaaagt	actgttagtg	agaaattaaa	attccttcag	gaggattaaa	ctgccatttc	480
agttacccta	attccaaatg	ttttggtggt	tagaatcttc	tttaatgttc	ttgaagaagt	540
gttttatatt	ttcccatcna	gataaattct	ctchcncett	nntttntnt	ctnntttttt	600
aaaacggant	cttgctccgt	tgccangct	gggaatttth	ttttggccaa	tctccgctnc	660
cttgcaanaa	tnctgcntcc	caaaattacc	ncctttttcc	cacctccacc	ccnnggaatt	720
acctggaatt	anaggccccc	ccccccccc	cggctaattt	gtttttgttt	ttagtaaaaa	780
acgggtttcc	tgtttttagtt	aggatggccc	anntctgacc	ccntnatcnt	ccccctcngc	840
cctcnaatnt	tnggnmtang	gcttaccccc	cccnngngtt	tttctcccat	tnaaattttc	900

tntggantct	tgaatnncgg	gttttccctt	ttaaaccnat	tttttttttn	nnnnccccan	960
ttttncctcc	cccntntnta	anggggggtt	cccaanccgg	gtccnccccc	angtccccaa	1020
tttttctccc	ccccctctt	ttttctttnc	cccaaaantc	ctatcttttc	ctnnaaatat	1080
cnantnt						1087

<210> 5

<211> 1010

<212> DNA

.<213> Homo sapien

<220>

<221> misc feature

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<223> n = A, T, C or G.

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aggtaacaca	catactatct	cccaaatacc	taccacacaag	ctcaacaatt	ttaaactggt	180
aggatcactg	gctctaatac	ccatgacatg	aggtcaccac	caaaccatca	agcgctaaac	240
agacagaatg	tttccactcc	tgatccactg	tgtgggaaga	agcaccgaac	ttaccctactg	300
gggggcctgc	ntcanaanaa	aagcccatgc	ccccgggtnt	ncctttnaac	cggaacgaat	360
naaccaccca	tccccacanc	tctctgttcc	ntgggcctcg	catcttgtgg	cctcntntnc	420
tttnggggan	acntggggaa	ggtagcccat	ttcnttgacc	ccncnanaaa	accccngtgg	480
ccctttgccc	tgattcnent	gggccttttc	tcttttccct	tttggggtgt	ttaaattccc	540
aatgtcccn	gaacctctc	cntnctgccc	aaaacctacc	taaattnctc	netangnntt	600
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aggcaggngg	ttcttccga	acttccaatt	ncaacagcnn	tgcccattgn	tgaaaccttt	840
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aaantcctta	ccccnaaaaa	ggttgcttag	ccccngtcc	ccactcccc	nggaaaaaatn	960
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<211> 950

<212> DNA

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ctgggattac	aggcgtgcaa	caccacaccc	ggctaatttt	gtatttttaa	tagagatggg	180
gttttccctt	gttggccann	atggtctcna	acccctgacc	tcnngtgatc	ccccncccn	240
nganctcna	ctgctgggga	tnnecgnnnn	nnnctcccn	nnnnnnnnnn	nnnnntccn	300
tnntccttnc	tccccnnnnn	cnnctnnctc	nncttctcnc	cnnntntnt	cnnncnccnn	360
cnncccnct	ncccnccnnt	tcnctnccnn	tnccnnccnn	nnctnnccnn	cnnnnctnn	420
ccnntacntc	ntnnnccnnt	ccntctntnn	ccctnnccnt	cctcncnct	tnctcctcn	480
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ccnccnnttc ettncnctn nnnntnctnn cnctncntc ntttctctt nntcccnnc 660
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agaaaaattc ttctgccttg agatgctgtt aatctgtaac cctagcccca accctgtgct 180
cacagagaca tgtgctgtgt tgactcaagg ttcaatggat ttagggctat gctttgttaa 240
aaaagtgtt gaagataata tgcttgtaa agtcatcac cattctctaa tctcaagtac 300
ccagggacac aatacactgc ggaaggccgc agggacctct gtctaggaaa gccaggatt 360
gtccaagatt tctccccatg tgatagcctg agatatggcc tcatgggaag ggtaagacct 420
gactgtcccc cagcccgaca tccccagcc cgacatcccc cagcccgaca cccgaaaagg 480
gtctgtgctg aggaagatta ntaaaagagg aaggctcttt gcattgaagt aagaagaagg 540
ctctgtctcc tgctcgtccc tgggcaataa aatgtcttgg tgtaaacc ccgaatgtatgt 600
tctacttact gagaatagga gaaaacatcc ttagggtctgg aggtgagaca cctggcgcc 660
atactgctct ttaatgcacg agatgtttgt ntaattgcca tccagggccca nccctttcc 720
ttaacttttt atganacaaa aactttgttc ncttttctg cgaacctctc cccctattan 780
cctattggcc tgcccatccc ctccccaan ggtgaaaana tgttentaaa tncgaggga 840
tccaaaacnt tttcccggtg gtccccttc caaccccgtc cctgggcccnn tttctcccc 900
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gccccctcaa attataacct tccnaaaca aannggctcn aagggtggtt gnttcgggtg 1020
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<212> DNA
<213> Homo sapien

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<223> n = A,T,C or G

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atgggtgttta aatccagcta cactacttcc tgactcaaac tccactatc ctgttcatga 180
ctgtcaggaa ctgttgaaa ctactgaaac tggccgacct gatcttcaaa atgtgcccct 240
aggaaaggtg gatgccaccg tggttcacaga cagtaccncc ttccctgaga agggactacg 300
aggggcccgt gcanctgtta ccaaggagac tnatgtgtt tgggtcagg ctttaccan 360

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ccatctacca	ggagcgtggg	ctactcactc	ggcaggtggc	tgtnatccac	tgtaaangga	540
catcaaaagg	aaaacnnggc	tggtgcccgt	ggtaaccana	aanctgacn	ncagctcnaa	600
gatgctgtgt	tgactttcac	tcncnctct	taaacttgct	gcccacantc	tcctttccca	660
accagatctg	cctgacaatc	cccatactca	aaaaaaaaan	aanactggcc	ccgaaccna	720
accaataaaa	acggggangg	tnggtnganc	nncctgaccc	aaaaataatg	gatcccccg	780
gctgcaggaa	ttcaattcan	ccttatcnat	acccccaaacn	ngnggggggg	ggcngtncc	840
cattccccct	ntattnattc	tttncccccc	ccccggcct	cctttttnaa	ctcgtgaaag	900
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aaaagcccnc	antcccntcc	naaatttgca	cngaaaggna	aggaatttaa	cctttatttt	1020
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aaanagaang	tttatttttc	cttngaacca	tcccaatana	aanacccgc	nggggaacgg	1140
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<211> 1146

<212> DNA

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agactccatc	agtgaggtca	aagcctgggg	cttttcagag	aagggaggat	tatgggtttt	180
ccaattatac	aagtcagaag	tagaaagaag	ggacataaac	caggaagggg	gtggagcact	240
catcaccag	agggacttgt	gcctctctca	gtggtagtag	aggggctact	tcctccacc	300
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gggatgaccc	taaggagta	ggctggtttt	aaggcggtgg	gactgggtga	gggaaactct	420
cctcttcttc	agagagaagc	agtacagggc	gagctgaacc	ggctgaagg	cgaggcgaaa	480
acacggtctg	gctcaggaag	accttggaag	taaaattatg	aatggtgcat	gaatggagcc	540
atggaagggg	tgctcctgac	caaactcagc	cattgatcaa	tgtaggggaa	actgatcagg	600
gaagccggga	atttcattaa	caaccggcca	cacagcttga	acattgtgag	gttcagtgc	660
ccttcaagg	gccactccac	tccaactttg	gccattctac	tttgcnaaat	ttccaaaact	720
tcctttttta	aggccgaatc	cntantccct	naaaaacnaa	aaaaaatctg	cncctattct	780
ggaaaaggcc	canccttac	caggctggaa	gaaattttnc	cttttttttt	tttttgaagg	840
cntttnttaa	attgaacctn	aattcncccc	cccaaaaaaa	aaccncncng	gggggaggat	900
ttccaaaaac	naattccctt	acaaaaaac	aaaaaccnc	ccttnttccc	ttcncctn	960
ttctttta	tagggagaga	tnaagcccc	caatttcncg	gnctngatnn	gtttcccccc	1020
ccccatttt	ccnaaacttt	ttcccancna	ggaancnc	ctttttttng	gtcngattna	1080
ncaaccttcc	aaaccatttt	tcnnaaaaa	ntttgntngg	ngggaaaaan	acctntttt	1140
atagan						1146

<210> 10

<211> 545

<212> DNA

<213> Homo sapien

<400> 10

cttcattggg	tacgggcucc	ctcgaggctcg	acggtatcga	taagcttgat	atcgaattcc	60
tcagcccg	gggatccact	agttctagag	tcaggaagaa	ccaccaacct	tcctgatttt	120

```

tattggctct gagttctgag gccagtttct ttcttctgtt gagtatgagg gattgtcagg 180
cagatctggc tgtggaaagg agactgtggg cagcaagttt agaggcgtga ctgaaagtca 240
cactgcatct tgagctgctg aatcagcttt ctggttacca cgggcaacag ccgtgttttc 300
cttttgatgt cctttacagt ggattacagc cacctgctga ggtgagtagc ccacgctcct 360
ggtagatggc tccacgtaca tgcacagtag caaaggcgta cctgctgtca gtgttaacgt 420
taatatecct accccatcgg agagcctgag tgagggcgat caattcagcc cttttgtgct 480
gaggtgtttg ctgggttaagc cctgaacca caacacatct gtctccatgg taacagctgc 540
accgg 545

```

```

<210> 11
<211> 196
<212> DNA
<213> Homo sapien

```

```

<400> 11
tctcctaggc tgggcacagt ggctcatacc tgtaatcctg accgtttcag aggtcaggt 60
ggggggatcg cttgagccca agatttcaag actagtctgg gtaacatagt gagaccctat 120
ctctacgaaa aaataaaaaa atgagcctgg tgtagtggca cacaccagct gaggagggag 180
aatcgagcct aggaga 196

```

```

<210> 12
<211> 388
<212> DNA
<213> Homo sapien

```

```

<220>
<221> misc_feature
<222> (1) ... (388)
<223> n = A,T,C or G

```

```

<400> 12
tctcctaggc ttgggggctc tgactagaaa ttcaaggaac ctgggattca agtccaactg 60
tgacaccaac ttacactgtg gntccaata aactgcttct ttcctattcc ctctctatta 120
aataaaataa ggaaaacgat gtctgtgtat agccaagtca gntatcctaa aaggagatac 180
taagtacat taaatatcag aatgtaaaac ctgggaacca ggttccnagc ctgggattaa 240
actgacagca agaagactga acagtactac tgtgaaaagc ccgaagmggc aatatgttca 300
ctctaccgtt gaaggatggc tgggagaatg aatgctctgt cccccagfcc caagctcact 360
tactatacct cctttatagc ctaggaga 388

```

```

<210> 13
<211> 337
<212> DNA
<213> Homo sapien

```

```

<400> 13
tagtagttgc ctataatcat gtttctcatt attttcacat tttattaacc aatttctgtt 60
taccctgaaa aatatgaggg aaatatatga aacagggagg caatgttcag ataattgatc 120
acaagatatg atttctacat cagatgctct ttcctttcct gtttatttcc tttttatttc 180
ggttgtgggg tgaatgtaa tagctttgtt tcaagagaga gttttggcag tttctgtage 240
ttctgacact gctcatgtct ccaggcatct atttgcactt taggaggtgt cgtggggagac 300
tgagaggtct attttttcca tatttgggca actacta 337

```

```

<210> 14
<211> 571
<212> DNA

```

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)... (571)

<223> n = A,T,C or G

<400> 14

tagtagttgc	catacagtcg	ctttccattt	atttaacccc	cacctgaacg	gcataaaactg	60
agtgttcagc	tgggtgtttt	tactgtaaac	aataaggaga	ctttgctctt	catttaaacc	120
aaaatcatat	ttcatatttt	acgctcgagg	gtttttaccg	gttccttttt	acactcctta	180
aaacagtttt	taagtcgttt	ggaacaagat	atTTTTtctt	tcctggcagc	ttttaacatt	240
atagcaaatt	tgtgtctggg	ggactgctgg	tcactgtttc	tcacagttgc	aaatcaaggc	300
atttgcaacc	aagaaaaaaa	aatttttttg	ttttatttga	aactggaccg	gataaacggt	360
gtttggagcg	gctgctgtat	atagttttta	atgggtttatt	gcacctcctt	aagttgcact	420
tatgtggggg	ggggnTTTTg	natagaaagt	ntttantcac	anagtcacag	ggacttttnt	480
cttttgynna	ctgagctaaa	aagggttnt	tttcgggtgg	gggcagatga	aggctcacag	540
gaggcctttc	tccttagagg	gggaactnct	a			571

<210> 15

<211> 548

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)... (548)

<223> n = A,T,C or G

<400> 15

tatatattta	ataacttaaa	tatatTTTga	tcaccactg	gggtgataag	acaatagata	60
taaaagtatt	tccaaaaagc	ataaaaccaa	agtatcatac	caaaccaaat	tcatactgct	120
tccccacccc	gcactgaaac	ttcaccttct	aactgtctac	ctaaccaaat	tctacccttc	180
aagtcttttg	tgcgtgctca	ctaetctttt	tttttttttt	tttnttttgg	agatggagtc	240
tggctgtgca	gcccaggggt	ggagtacaat	ggcacaacct	cagctcactg	naacctccgc	300
ctcccagggt	catgagattc	tcctgnttca	gccttcccag	tagctgggac	tacaggtgtg	360
catcaccatg	ectggntaat	cttttttngt	tttngggtag	agatgggggt	tttacatgtt	420
ggccaggntg	gtntcgaact	cctgacctca	agtgatccac	ccaectcagg	ctcccaaagt	480
gctaggatta	cagacatgag	ccactgngcc	cagncttggt	gcatgctcac	ttctctaggg	540
aactacta						548

<210> 16

<211> 638

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)... (638)

<223> n = A,T,C or G

<400> 16

ttccgttatg	cacatgcaga	atattctatc	ggtaacttcag	ctattactca	ttttgatggc	60
gcaatccgag	cctatcctca	agatgagtat	ttagaaagaa	ttgattttage	gatagaccaa	120
gctggtaagc	actctgacta	cacgaaattg	ttcagatgtg	atggatttat	gacagttgat	180

```

ctttggaaga gattattaag tgattatattt aaaggggaatc cattaattcc agaatatctt 240
ggtttagctc aagatgatat agaaatagaa cagaaagaga ctacaaatga agatgtatca 300
ccaactgata ttgaagagcc tatagtagaa aatgaattag ctgcatttat tagccttaca 360
catagcgatt ttcttgatga atcttatatt cagccatcga catagcatta cctgatgggc 420
aaccttacga ataatagaaa ctgggtgctg ggctattgat gaattcatcc ncagtaaatt 480
tggatatnac aaaatataac tcgattgcat ttggatgatg gaatactaaa tctggcaaaa 540
gtaactttgg agctactagt aacctctctt ttgagatgc aaaattttct ttaggggtt 600
cttattctct actttacgga tattggagca taacggga 638

```

<210> 17

<211> 286

<212> DNA

<213> Homo sapien

<400> 17

```

actgatggat gtgcgccgag ggcagggggc ttatctgatg ctcggetgcc tgttcgtgat 60
gtgcgcggcg attgggctgt ttatctcaaa caccgccacg ggggtgctga tggcgccat 120
tgccttagcg gcggcgaagt caatgggcgt ctcacctat ccttttgcca tgggtgggtgc 180
gatggcggtc tcggcggcgt ttatgacccc ggtctctctg ccggttaaca cctgggtgct 240
tggccctggc aagtactcat ttagegattt tgtcaaaata ggcgtg- 286

```

<210> 18

<211> 262

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1) ... (262)

<223> n = A,T,C or G

<400> 18

```

tcggtcatag cagcccttc ttctcaattt catctgtcac taccctgggtg tagtatctca 60
tagccttaca tttttatagc ctctccctg gtctgtcttt tgattttctt gctgttaac 120
catatcacac ataactgcaa gtaaacattt ctaaagtgtg gttatgtcga tctcactct 180
gtgncaagaa atagtttcca ttaccgtctt aataaaatc ggatttgttc tttctattn 240
tcactcttca cctatgaccg aa 262

```

<210> 19

<211> 261

<212> DNA

<213> Homo sapien

<400> 19

```

tcggtcatag caaagccagt ggtttgagct ctctactgtg taaactccta aaccaaggcc 60
atztatgata aatggtggca ggatttttat tataaacatg taccatgca aatttcctat 120
aactctgaga tatattcttc tacatttaaa caataaaaat aatctatttt taaaagccta 180
atthgcgtag ttaggttaaga gtgtttaatg agaggggtata aggtataaat caccagtcaa 240
cgtttctctg cctatgaccg a 261

```

<210> 20

<211> 294

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1) ... (294)

<223> n = A,T,C or G

<400> 20

tacaacgagg	cgacgtcggg	aaaatcggac	atgaagccac	cgctgggtctt	ttcgtccgag	60
cgataggcgc	cggccagcca	gcggaacggg	tgcccggatg	gcgaagcgag	ccggagttct	120
tcggactgag	tatgaatctt	gttgtgaaaa	tactcgccgc	cttcgttcga	cgacgtcggg	180
tcgaaatctt	cgantctctt	acgatcgaag	tcttcgtggg	cgacgatcgc	ggtcagttcc	240
gccccaccga	aatcatgggt	gagccggatg	ctgncccca	agncctcgtt	tgtn	294

<210> 21

<211> 208

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1) ... (208)

<223> n = A,T,C or G

<400> 21

ttggtaaagg	gcatggacgc	agacgcctga	cgtttggtcg	aaaatcttct	attgattcgt	60
atcaatgaat	aggaaaattc	ccaaagaggg	aatgtcctgt	tgctcgccag	ttttnttggt	120
gttctcatgg	anaaggcaan	gagctcttca	gactattggn	attntcgttc	ggtcttctgc	180
caactagtcg	ncttgcnang	atcttcat				208

<210> 22

<211> 287

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1) ... (287)

<223> n = A,T,C or G

<400> 22

ncnttgagc	tgagtgattg	agatntgtaa	tggttgtaag	ggtgattcag	gcggattagg	60
gtggcggggtc	acccggcagt	gggtctcccg	acaggccagc	aggatttggg	gcaggtacgg	120
ngtgcccatc	gctcgactat	atgctatggc	aggcgagccg	tggaaggngg	atcaggtcac	180
ggcgctggag	ctttccacgg	tccatgnatt	gngatggctg	ttctaggcgg	ctgttgccaa	240
gcgtgatggg	acgctggctg	gagcattgat	ttctgggtgcc	aaggtgg		287

<210> 23

<211> 204

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1) ... (204)

<223> n = A,T,C or G

<400> 23

```

ttgggttaaag ggagcaagga gaaggcatgg agaggctcan gctggtcctg gcctacgact    60
gggccaagct gtcgccgggg atgggtggaga actgaagcgg gacctcctcg aggtcctccg    120
necgtacttc nccgtccagg aggaggggtct tccgtgggtc tnggaggagc ggggggagaa    180
gatnctcttc atggtcnaca tccc                                204

```

<210> 24

<211> 264

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(264)

<223> n = A,T,C or G

<400> 24

```

tggattgggtc aggagcgggt agagtggcac cattgagggg atattcaaaa atattatattt    60
gtcctaaatg atagtgtctg agtttttctt tgacctatga gttatattgg agtttatattt    120
ttaactttcc aatgcgatgg acatgttaga cttattttct gtaatgatt nctattttta    180
ttaaattgga ttgagaaat tggttnttat tatatcaatt tttggtattt gttgagtttg    240
acattatagc ttagtatgtg acca                                264

```

<210> 25

<211> 376

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(376)

<223> n = A,T,C or G

<400> 25

```

ttacaacgag gggaaactcc gtctctacaa aaattaaaaa attagccagg tgtggtgggtg    60
tgcaccgcga atcccagcta cttgggaggt tgagacacaa gantcaccta natgtgggag    120
gtcaagggtt catgagtcac gattgtgcca ctgcactcca gcctgggtga cagaccgaga    180
ccctgectca anaganaang aataggaagt tcagaaatcn tggntgtggn gccagcaat    240
ctgcacttat ncaacccctg caggcaangc tgatgcagcc tangttcaag agctgctgtt    300
tctggaggca gcagttnggg cttccatcca gtatcacggc cacactcgca cnagccatct    360
gtcctccgtn tgnnac                                376

```

<210> 26

<211> 372

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(372)

<223> n = A,T,C or G

<400> 26

```

ttacaacgag gggaaactcc gtctctacaa aaattaaaaa attagccagg tgtggtgggtg    60
tgcacctgta atcccagcta cttgggcggc tgagacacaa gaaccaccta aatgtgggag    120

```



```

ggccaagggtt gcatgagtc tgcacggcc actgcactcc agcctgggtg acagactgag 180
accctgcctc aaaagaaaaa gaataggaag ttcagaaacc ctgggtgtgg ngcccagcaa 240
tctgcattta aacaatccct gcaggcaatg ctgatgcagc ctaagttcaa gagctgctgt 300
tctggaggca gnagtaaggg cttccatcca gcatcacggn caacactgca aaagcacctg 360
tcctcgttgg ta 372

```

<210> 27

<211> 477

<212> DNA

<213> Homo sapien

<400> 27

```

ttctgtccac atctacaagt tttatattt ttgtgggttt tcagggtgac taagtttttc 60
cctacattga aaagagaagt tgctaaaagg tgcacaggaa atcatttttt taagtgaata 120
tgataatatg ggtccgtgct taatacaact gagacatatt tgttctctgt ttttttagag 180
tcacctctta aagtccaatc ccacaatggg gaaaaaaaaa tagaaagtat ttgttctacc 240
tttaaggaga ctgcagggat tctccttgaa aacggagtat ggaatcaatc ttaaataaat 300
atgaaattgg ttggtcttct gggataagaa attcccaact cagtgtgctg aaattcacct 360
gacttttttt gggaaaaaat agtcgaaaat gtcaatttgg tccataaaat acatgttact 420
attaaaagat atttaaagac aaattctttc agagctctaa gattgggtgtg gacagaa 477

```

<210> 28

<211> 438

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1) ... (438)

<223> n = A,T,C or G

<400> 28

```

tctncaacct cttgantgtc aaaaaccttn taggetatct ctaaaagctg actggtattc 60
attccagcaa aatccctcta gtttttggag ttccctttta ctatctgggg ctgcctgagc 120
cacaaatgcc aaattaagag catggctatt ttggggggct gacagggtcaa aaggggtgta 180
aatccgataa gcctcctgga ggtgctctaa aaacactcct ggtgactcat catgcccctg 240
gacgacttca atcgncttag acaagtttat aggtttctgg gcagctccct gaatacccac 300
gaggagatac cgggtggaaat cgtcaaaaag tctccctcca cttgagaaat ttgggtccca 360
attaggtccc aattgggtct ctaatcacta ttctctetage ttctctctcc ggnctattgg 420
ttgatgtgag gttgaaga 438

```

<210> 29

<211> 620

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1) ... (620)

<223> n = A,T,C or G

<400> 29

```

aagaggggtac cagccccaag ccttgacaac ttccataggg tgtcaagcct gtgggtgcac 60
agaagtcaaa aattgagttt tgggatcctc agcctagatt tcagaggata taaagaaaca 120
cctaacacct agatattcag acaaaagttt actacaggga tgaagctttc acggaaaacc 180

```

```

totactagga aagtacagaa gagaaatgtg ggtttggagc ccccaaacag aatccccctct 240
agaacactgc ctaatgaaac tgtgagaaga tggccactgt catccagaca ccagaatgat 300
agaccaccca aaaacttatg ccatattgcc tataaaacct acagacactc aatgccagcc 360
ccatgaaaaa aaaactgaga agaagactgt nccctacaat gccaccggag cagaactgcc 420
ccaggccatg gaagcacagc tcttatatca atgtgacctg gatgttgaga catggaatcc 480
nangaaatcn ttttaanact tccacggtnn aatgactgcc ctattanatt cngaacttan 540
atcnggcct gtgacctctt tgctttggcc attccccctt tttggaatgg ctnttttttt 600
cccatgctg tncctctta 620

```

<210> 30

<211> 100

<212> DNA

<213> Homo sapien

<400> 30

```

ttacaacgag ggggtcaatg tcataaatgt cacaataaaa caatctcttc tttttttttt 60
tttttttttt tttttttttt tttttttttt tttttttttt 100

```

<210> 31

<211> 762

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1) ... (762)

<223> n = A, T, C or G

<400> 31

```

tagtctatgc gccggacaga gcagaattaa attggaagtt gccctcggga ctttctaccc 60
acactcttcc tgaaaagaga aagaaaagag gcaggaaaga ggtaggatt tcattttcaa 120
gagtcagcta attaggagag cagagtttag acagcagtag gcaccccatg atacaaacca 180
tggacaaaagt ccctgttttag taactgccag acatgatcct gctcagggtt tgaaatctct 240
ctgcccataa aagatggaga gcaggagtgc catccacatc aacacgtgtc caagaaagag 300
tctcagggag acaaggggat caaaaaacaa gattcttaat gggaaggaaa tcaaaccaaa 360
aaattagatt tttctctaca tatatataat atacagatat ttaacacatt attccagagg 420
tggctccagt ccttggggct tgagagatgg tgaaaacttt tgttccacat taacttctgc 480
tctcaaattc tgaagtatat cagaatggga caggcaatgt tttgctccac actggggcac 540
agaccctaat ggttctgtgc ccgaagaaga gaagcccga agacatgaag gatgcttaag 600
gggggttggg aaagcccaat tggtantatc ttttcctcct gcctgtgttc cngaagtctc 660
cnetgaagga attcttaaaa ccctttgtga ggaaatgcc ccttaccatg acaantggtc 720
ccattgcttt tagggngatg gaaacaccaa gggttttgat cc 762

```

<210> 32

<211> 276

<212> DNA

<213> Homo sapien

<400> 32

```

tagtctatgc gtgtattaac ctccccctcc tcagtaacaa ccaaagaggc aggagctggt 60
attaccaacc ccattttaca gatgcacaa taatgacaga gaagtgaagt gacttgcgca 120
cacaaccagt aaattggcag agtcagatgt gaatccatgg agtctgggtc gcactttcaa 180
tcaccgaata ccctttctaa gaaacgtgtg ctgaatgagt gcatggataa atcagtgtct 240
actcaacatc tttgcctaga tatcccgcat agacta 276

```

<210> 33
<211> 477
<212> DNA
<213> Homo sapien

<400> 33

tagtagttgc	caaattttg	aaaattttacc	cagaagtgat	tgaaaacttt	ttggaaacaa	60
aaacaaataa	agccaaaagg	taaaataaaa	atatctttgc	actctcgta	ttacctatcc	120
ataacttttt	caccgtaagc	tctcctgctt	gttagtgtag	tgtgggtata	ttaaactttt	180
tagttattat	tttttattca	cttttccact	agaaagtcac	tattgattta	gcacacatgt	240
tgatctcatt	tcattttttc	tttttatagg	caaaatttga	tgctatgcaa	caaaaatact	300
caagcccatt	atcttttttc	ccccgaaat	ctgaaaattg	caggggacag	agggaagtta	360
tccattataa	aaattgtaaa	tatgttcagt	ttatgtttta	aatgcacaa	aacataagaa	420
aattgtgttt	acttgagctg	ctgattgtaa	gcagttttat	ctcaggggca	actacta	477

<210> 34
<211> 631
<212> DNA
<213> Homo sapien

<400> 34

tagtagttgc	caattcagat	gatcagaaat	gctgctttcc	tcagcattgt	cttggttaaac	60
cgcatgccat	ttggaacttt	ggcagtgaga	agccaaaagg	aagagggtgaa	tgacatatat	120
atatatatat	attcaatgaa	agtaaaatgt	atatgctcat	atactttcta	gttatcagaa	180
tgagtttaagc	tttatgccat	tgggctgctg	catattttta	tcagaagata	aaagaaaatc	240
tgggcatttt	tagaatgtga	tacatgtttt	tttaaaactg	ttaaatatta	tttcgatatt	300
tgtctaagaa	ccggaatgtt	cttaaaatct	actaaaacag	tattgtttga	ggaagagaaa	360
actgtactgt	ttgccattat	tacagtcgta	caagtgcacg	tcaagtcacc	cactctctca	420
ggcatcagta	tccacctcat	agctttacac	attttgacgg	ggaatattgc	agcatcctca	480
ggcctgacat	ctgggaaagg	ctcagatcca	cctactgctc	cttgctcggt	gatttgtttt	540
aaaatattgt	gcctgggtgt	acttttaagc	cacagccctg	cctaaaaycc	agcagagaa	600
agaaccgcga	ccattctata	ggcaactact	a			631

<210> 35
<211> 578
<212> DNA
<213> Homo sapien

<400> 35

tagtagttgc	catcccatat	tacagaaggc	tctgtataca	tgacttattt	ggaagtgatc	60
tgttttctct	ccaaacccat	ttatcgtaat	ttcaccagtc	ttggatcaat	cttggtttcc	120
actgatacca	tgaaacctac	ttggagcaga	cattgcacag	ttttctgtgg	taaaaactaa	180
aggtttattt	gctaagctgt	catcttatgc	ttagtatttt	ttttttacag	tggggaattg	240
ctgagattac	attttgttat	tcattagata	ctttgggata	acttgacact	gtcttctttt	300
tttcgctttt	aattgctatc	atcatgcttt	tgaacaaga	acacattagt	cctcaagtat	360
tacataagct	tgettgttac	gcctggtggt	ttaaaggact	atctttggcc	tcagggtcac	420
aagaatgggc	aaagtgtttc	cttatgttct	gtagttctca	ataaaagatt	gccaggggcc	480
gggtactgtg	gctcgactg	taatcccagc	actttgggaa	gctgaggctg	gcggatcatg	540
ttagggcagg	tgttcgaaac	cagcctgggc	aactacta			578

<210> 36
<211> 583
<212> DNA
<213> Homo sapien

<400> 36

tagtagttgc	ctgtaatccc	agcaactcag	gaggctgggg	caggagaatc	agttgaacct	60
gggaggcaga	agttgtaatt	agcaaagatc	gcaccattgc	acttcagcct	gggcaacaag	120
agtgagattc	catctcaaaa	acaaaaaaaa	gaaaaagaaa	agaaaaggaa	aaaacgtata	180
aaccagccca	aaacaaaatg	atcattcttt	taataagcaa	gactaattta	atgtgtttat	240
ttaatcaaa	cagttgaatc	ttctgagtta	ttggtgaaaa	tacccatgta	gttaatttag	300
ggttcttact	tgggtgaacg	tttgatgttc	acagggtata	aaatggttaa	caaggaaaat	360
gatgcataaa	gaatcttata	aactactaaa	aataaataaa	atataaatgg	atagggtgcta	420
tggatggagt	ttttgtgtaa	tttaaaatct	tgaagtcatt	ttggatgctc	attgggtgtc	480
tggtaatttc	cattaggaaa	aggttatgat	atggggaaac	tgtttctgga	aattgcggaa	540
tgtttctcat	ctgtaaaatg	ctagtatctc	agggcaacta	cta		583

<210> 37

<211> 716

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(716)

<223> n = A,T,C or G

<400> 37

gatctactag	tcatntggat	tctatccatg	gcagctaagc	ctttctgaat	ggattctact	60
gctttcttgt	tctttaatcc	agacccttat	atatgtttat	gttcacaggc	agggcaatgt	120
ttagtgaaaa	caattctaaa	ttttttat	tgcattttca	tgctaatttc	cgtcacactc	180
cagcaggctt	cctgggagaa	taaggagaaa	tacagctaaa	gacattgtcc	ctgcttactt	240
acagccta	ggtagcaaaa	accacttcaa	taaagtaaca	ggaaaagtac	taaccaggta	300
gaatggacca	aaactgatat	agaaaaatca	gaggaagaga	ggaacaaata	tttactgagt	360
cctagaatgt	acaaggcttt	ttaattacat	attttatgta	aggcctgcaa	aaaacagggtg	420
agtaatcaac	atgtgtccca	ttttacatat	aaggaaactg	aagcttaaat	tgaataattt	480
aatgcataga	ttttatagtt	agaccatggt	cagggtcccta	tggtatactt	actagctgta	540
tgaatatgag	aaaataattt	tggtattttc	ttggcatcag	tattttcatc	tgcaaaaataa	600
agctaaagtt	attagcaaaa	cagtcagcat	agtgcctgat	acatagtagg	tgctccaaac	660
atgattacnc	tantatnngg	tattanaaaa	atccaatata	ggcntggata	aaaccg	716

<210> 38

<211> 688

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(688)

<223> n = A,T,C or G

<400> 38

ttctgtccac	atatcatccc	actttaattg	ttaatcagca	aaactttcaa	tgaaaaatca	60
tccattttta	ccaggatcac	accaggaaac	tgaagggtga	ttttttttta	ccttaaaaaa	120
aaaaaaaaa	accaaacaaa	ccaaaacaga	ttaacagcaa	agagttctaa	aaaattttaca	180
tttctcttac	aactgtcatt	cagagaacaa	tagttcttaa	gtctgttaaa	tcttggcatt	240
aacagagaaa	cttgatgaan	agttgtactt	ggaatattgt	ggattttttt	ttttgtctaa	300
tctcccccta	ttgttttgcc	aacagtaatt	taagtttgtg	tggaacatcc	cctgagttga	360
agtgtaaaca	atgtatagga	aggaatatat	gataagatga	tgcatcacat	atgcattaca	420
tgtagggacc	ttcacaactt	catgcactca	gaaaacatgc	ttgaagagga	ggagaggacg	480

gccagggtc accatccagg tgccttgagg acagagaatg cagaagtggc actgttgaaa 540
tttagaagac catgtgtgaa tggtttcagg cctgggatgt ttgccacca gaagtgcctc 600
cgagaaattt ctttcccat tgggaatacag ggtggcttga tgggtacggg gggtgacca 660
acgaagaaaa tgaaattctg ccttttcc 688

<210> 39
<211> 585
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1) ... (585)
<223> n = A,T,C or G

<400> 39
tagtagttgc cgcnnaccta aaanttggaa agcatgatgt ctaggaaaca tantaaaata 60
gggtatgect atgtgctaca gagagatgtt agcatttaaa gtgcatantt ttatgtattt 120
tgacaaatgc atatnccctc ataataccaca actgattacg aagctattac aattaaaaag 180
tttgcccggt cgtggtgggc ggtggctgac gctgtaatc ccagcacttt gggaggccga 240
ggcacgcgga tcacgaggtc gggagttaa gaccatcctg gctaacacgg tgaaagtcca 300
tctctactaa aaatacga aaattacccc ggcgtgggtg cgggcgcctg tagtcccagc 360
tactccggag gctgaggcag gagaatggcg tgaacccagg acacggagct tgcagtgtgc 420
caacatcacg tcactgcctt ccagcctggg ggacaggaac aagantcccg tctcanaaa 480
agaaaaatac tactnatant ttcnacttta ttttaantta cacagaactn cctcttggtg 540
cccccttacc attcatctca cccacctcct atagggcacn nctaa 585

<210> 40
<211> 475
<212> DNA
<213> Homo sapien

<400> 40
tctgtccaca ccaatcttgg aagctctgaa aagaatttgt ctttaaatat cttttaatag 60
taacatgtat tttatggacc aaattgacat tttcgactgt tttttccaaa aaagtcagggt 120
gaatttcagc aactgagtt gggaatttct tatcccagaa gaccaaccaa tttcatattt 180
atttaagatt gattccatac tccgttttca aggagaatcc ctgcagtctc cttaaaggta 240
gaacaaatac ttcctatttt tttttcacca ttgtgggatt ggactttaag aggtgactct 300
aaaaaaacag agaacaaata tgtctcagtt gtattaaagca cggacccata ttatcatatt 360
cacttaaaaa aatgatttcc tgtgcacctt ttggcaactt ctcttttcaa tgtagggaaa 420
aacttagtca cctgaaaac ccacaaaata aataaaactt gtagatgtgg acaga 475

<210> 41
<211> 423
<212> DNA
<213> Homo sapien

<400> 41
taagagggtg catcgggtaa gaacgtaggc acatctagag cttagagaag tctggggtag 60
gaaaaaaatc taagtattta taagggtata ggtaacattt aaaagtaggg ctagctgaca 120
ttatttagaa agaacaata cggagagata agggcaaagg actaagacca gaggaacact 180
aatatttagt gatcacttcc attcttggtg aaaatagtaa cttttaagtt agcttcaagg 240
aagatttttg gccatgatta gttgtcaaaa gttagtcttc ttgggtttat attactaatt 300
ttgttttaag atccttggtg gtgctttaat aaagtcaggt tatatcaaac gctctaaaac 360
attgtagcat gttaaatgtc acaatatact taccatttgt tgtatatggc tgtaccctct 420

cta

423

<210> 42
<211> 527
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(527)
<223> n = A,T,C or G

<400> 42

tctcctaggc	taatgtgtgt	gtttctgtaa	aagtaaaaag	ttaaaaattt	taaaaataga	60
aaaaagctta	tagaataaga	atatgaagaa	agaaaatatt	ttgtacatt	tgcacaatga	120
gtttatgttt	taagctaagt	gttattacaa	aagagccaaa	aagggtttta	aaattaaaac	180
gtttgtaaag	ttacagtacc	cttatgttaa	tttataattg	aagaaagaaa	aacttttttt	240
tataaatgta	gtgtagccta	agcatacagt	atttataaag	tctggcagtg	ttcaataatg	300
tcctaggcct	tcacattcac	tcactgactc	accagagca	acttccagtc	ctgtaagctc	360
cattcgtggt	aagtgccta	tacagggtgca	ccatttattt	tacagtattt	ttactgtacc	420
ttctctatgt	ttccatatgt	ttcgatatac	aaataccact	ggttactatn	gcccacaggg	480
taattccagt	aacacggcct	gtatacgtct	ggtancccta	gngaaga		527

<210> 43
<211> 331
<212> DNA
<213> Homo sapien

<400> 43

tcttcaacct	cgtaggacaa	ctctcatatg	cctgggcact	atttttaggt	tactaccttg	60
gctgcccttc	tttaagaaaa	aaaaaagaag	aaaaaagaac	ttttccacaa	gtttctcttc	120
ctctagttag	aaaattagag	aaatcatggt	tttaattttg	tgttatttca	gatcacaaat	180
tcaaacactt	gtaaacatta	agcttctgtt	caatcccctg	ggaagaggat	tcattctgat	240
atttacgggt	caaaagaagt	tgtaatatgt	tgcttggaac	acagagaacc	agttattaac	300
ttcctactac	tattatataa	taaataataa	c			331

<210> 44
<211> 592
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(592)
<223> n = A,T,C or G

<400> 44

ggcttagtag	ttgccaggca	aaatarcgtt	gattctcttc	aggagccacc	cccaacaccc	60
ctgtttgctt	ctagacctat	acctagacta	aagtcaccagc	agacccttag	aggtgaggtt	120
cagagtgacc	cttgaggaga	tgtgctacac	tagaaaagaa	ctgcttgagt	tttctaattt	180
atataagcag	aaatctggag	aagagtcata	ggaatggata	ttaaggggtg	gagataatgg	240
cggaaggaat	atagagttgg	atcaggctgg	acttattgat	ttgaaccac	taagtagaga	300
ttctgctttt	gatgttgacg	ctcagggagt	taaaaaaggt	tttaatgggt	ctaatagttt	360
atttgcttgg	ttagctgaaa	tatggataaa	agatggccca	ctgtgagcaa	gctggaaatg	420
cctgatctct	ctcagtttaa	tgtagaggaa	gggatccaaa	agtttaggga	ganttggatg	480

ctggraktgg attggtcact ttgrgaccta cccwtcccag ctgggagggg ccagaagata 540
cacccttgac caacgctttg cgaaatggat ttgtgatggc ggcaactact aa 592

<210> 45
<211> 567
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1) ... (567)
<223> n = A,T,C or G

<400> 45
ggcttagtag ttgccattgc gagggttgc tcaacgagcg ttgaacatgg cggattgtct 60
agattcaacg gatttgagtt ttaccagcaa agcgaaccaa gcgcggccca gagaattatg 120
ggttgggttg ctttgaagaag atggaaatcc tgtaggccta gtcagaaaag ctttcttgca 180
gaacagttgg ttctcgggcg aacgctcacc aagatgccca ttggaaaggc tagcgtgtat 240
ttgggagagc ctgatagcgt gtcttctgat gatgtttgtg cttggacagt gacaaaagat 300
atgcaaagca agtccgaaact agacgtcaag cttcgtgagc aaattattgt agactcctac 360
ttatactgtg aggaatgata gccaaaggtg gggactttaa gactaagggtg gtttgtactt 420
gcgccgatga tcccaggcag aaagamctga tctgtagttt tatacgggca actactaagc 480
cgaattccag cacactggcg gccgttacta attggatccg anctcgggtac cagcttgatg 540
cataacttga gttwtctata ntgtcnc 567

<210> 46
<211> 908
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1) ... (908)
<223> n = A,T,C or G

<400> 46
gagcgaaaga ccgagggcag ngmntangng cgangaagcg gagagggcca aaaagcaacc 60
gctttccccg ggggggtgccg attcattaag gcaggtggag gacaggtttc ccgatggaag 120
gcggcagggg cgcaagcaat taatgtgagt aggccattca ttagcaccgg ggcttaacat 180
ttaagcttcg gggttggtatg tgggtgggaat tgtgagcgga taacaatttc acacaggaaa 240
cagctatgac catgattacg ccaagctatt taggtgacat tatagaataa ctcaagttat 300
gcatcaagct tggtagccag ttccggtacca ctagtaacgg ccgccagtgt gtggaattcg 360
gcttagtagt tgccgaccat ggagtgctac ctaggctaga atacctgagy tctcctctag 420
cctcactcac attaaattgt atcttttcta cattagatgt cctcagcgcc ttatttctgc 480
tggacwatcg ataaattaat cctgatagga tgatagcagc agattaatta ctgagagtat 540
gttaattgtg catccctcct atataacgta tttgcatttt aatggagcaa ttctggagat 600
aatccctgaa ggcaaaggaa tgaatcttga gggtagagaa gccagaatca gtgtccagct 660
gcagttgtgg gagaagggtga tattatgtat gtctcagaag tgacaccata tgggcaacta 720
ctaagccga attccagcac actggcgggc gttactaatg gatccgagct cggtagcaag 780
cttgatgcac agcttgagta tctatagtgt cactaaatag cctggcggtta tcatgggtcat 840
agctgtttcc tgtgtgaaat tgttatccgc tcccaattcc ccccaccata cgagccggaa 900
cataaagt 908

<210> 47
<211> 480

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(480)

<223> n = A,T,C or G

<400> 47

tgccaacaag gaaagtttta aatttccct	tgaggattct	tggtgatcat	caaattcagt	60
ggtttttaag gttgttttct gtcaaataac	tctaacttta	agccaaacag	tatatggaag	120
cacagataka atattacaca gataaaagag	gagttgatct	aaagtaraga	tagttggggg	180
ctttaatttc tggaacctag gtctcccat	cttcttctgt	gctgaggaa	ttcttggaag	240
cggggattct aaagttcttt ggaagacagt	ttgaaaacca	ccatgttgtt	ctcagtacct	300
ttatttttaa aaagtaggtg aacattttga	gagagaaaag	ggcttggtg	agatgaagtc	360
ccccccccc cttttttttt ttttagctga	aatagatacc	ctatgttnaa	rgaarggatt	420
attatttacc atgccaytar scacatgctc	tttgatgggc	nyctccstac	cctccttaag	480

<210> 48

<211> 591

<212> DNA

<213> Homo sapien

<400> 48

aagaggggtac cgagtggaat ttccggttca	ctagtctggt	gtggctagtc	ggtttcgtgg	60
tgccaacat taogaacttc caactcaacc	gttcttggac	gttcaagcgg	gagtaccggc	120
gaggatggtg gcgtgaattc tggectttct	ttgccgtggg	atcggtagcc	gccatcatcg	180
gtatgtttat caagatcttc tttactaacc	cgacctctcc	gatttacctg	cccgagccgt	240
ggtttaacga ggggaggggg atccagtcac	gcgagtaactg	gtcccagatc	ttcgccatcg	300
tcgtgacaat gcctatcaac ttctgtctca	ataagttgtg	gaccttcoga	acggtgaagc	360
actccgaaaa cgtccgggtg ctgctgtgcg	gtgactccca	aaatottgat	aacaacaagg	420
taaccgaatc gcgctaagga acccggcat	ctcgggtact	ctgcataatg	gtaccctta	480
agccgaatc cagcacactg gcggcgtta	ctaattggat	ccgaactccg	taaccaagcc	540
tgatgcgtaa cttgagttat tctatagtgt	ccctaaaata	acctggcgtt	a	591

<210> 49

<211> 454

<212> DNA

<213> Homo sapien

<400> 49

aagaggggtac ctgccttgaa atttaaagt	ctaaggaaar	tgggagatga	ttaagagttg	60
gtgtggcyta gtcacaccaa aatgtattta	ttacatcctg	ctcctttcta	gttgacagga	120
aagaaagctg ctgtggggaa aggaggata	aatactgaag	ggatttacta	aacaaatgtc	180
catcacagag ttttctttt ttttttttg	agacagagtc	ttgctctgtc	acctaggctg	240
gaatgaagwg gtatgatctc agttgaatgc	aacctctacc	tcctaggttc	aagcgattct	300
catgcctcag cctcctgagc agctgggact	ataggcgcat	gctaccatgc	caggctaatt	360
tttatatttt tattagagac ggggtgttgc	catgttggcc	aggcagggtc	cgaactcctg	420
ggcctcagat gatctgcccc accgtaccct	ctta			454

<210> 50

<211> 463

<212> DNA

<213> Homo sapien

<400> 50
aagagggtac caaaaaaaag aaaaaggaaa aaaagaaaa caacttgat aaggctttct 60
gctgcataca gctttttttt tttaaataaa tggtgccaac aaatgttttt gcattcacac 120
caattgctgg ttttgaaatc gtactcttca aagggtattg tgcagatcaa tccaatagtg 180
atgccccgta ggttttgtgg actgcccacg ttgtctacct tctcatgtag gagccattga 240
gagactgttt ggacatgcct gtgttcattg agccgtgatg tccggggggc gtgtacatca 300
tgttacogtg ggggtggggtc tgcattggct gctgggcata tggctgggtg cccatcatgc 360
ccatctgcat ctgcataggg tattggggcg tttgatccat atagccatga ttgctgtggt 420
agccactgtt catcattggc tgggacatgc tgttaccctc tta 463

<210> 51

<211> 399

<212> DNA

<213> Homo sapien

<400> 51
cttcaacctc ccaagtgtt gggattacag gactgagcca ccacgctcag cctaagcctc 60
tttttcaacta cctctaagc gatctaccac agtcatgagg ggctaaagag cagtgcatt 120
tgattacaat aatggaactt agatttatta attacaatt tttccttagc atgttggttc 180
cataattatt aagagtatgg acttacttag aaatgagctt tcattttaag aatttcattc 240
ttgaccttct ctattagtct gagcagtatg acactatacg tattttattt aactaaccta 300
ccttgagcta ttacttttta aaaggctata tacatgaatg tgtattgtca actgtaaagc 360
cccacagtat ttaattatat catgatgtct ttgagggtg 399

<210> 52

<211> 392

<212> DNA

<213> Homo sapien

<400> 52
cttcaacctc aatcaacctt ggtaattgat aaaatcatca ctttaactttc tgatataatg 60
gcaataatta tctgagaaaa aaaagtgggtg aaagattaaa cttgcatttc tctcagaatc 120
ttgaaggata tttgaataat tcaaaaagcgg aatcagtagt atcagccgaa gaaactcact 180
tagctagaac gttggaccca tggatctaag tccctgcctt tccactaacc agctgattgg 240
ttttgtgtaa acctctaca cgcttgggct tggtegcctc atttgtcaaa gtaaaggctg 300
aaataggaag ataatgaacc gtgtcttttt ggtctctttt ccatccatta ctctgatttt 360
acaaagagggc ctgtattccc ctggtgaggt tg 392

<210> 53

<211> 179

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1) ... (179)

<223> n = A, T, C or G

<400> 53
ttcgggtgat gctcctcag gctacagtga agactggatt acagaaaagg gccagcgaga 60
tttcagattc ctgtaaacct ctaaagaaaa ggagtcgcgc ctcaactgat gtagaaatga 120
ctagttcagc atacngagac acntctgact ccgattctag aggactgagt gacctgcan 179

<210> 54

<211> 112

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(112)

<223> n = A,T,C or G

<400> 54

```

ttcgggtgat gcctcctcag gctacatcat natagaagca aagtagaana atcnnngtttg      60
tgcattttcc cacanacaaa attcaaatga ntggaagaaa ttggganagt at                112

```

<210> 55

<211> 225

<212> DNA

<213> Homo sapien

<400> 55

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tgagcttccg cttctgacaa ctcaatagat aatcaaagga caactttaac agggattcac      60
aaaggagtat atccaaatgc caataaacat ataaaaagga attcagcttc atcatcatca     120
gaagwatgca aattaaaacc ataatgagaa accactatgt cccactagaa tagataaaat     180
cttaaaagac tggtaaaacc aagtgttggt aaggcaagag gagca                      225

```

<210> 56

<211> 175

<212> DNA

<213> Homo sapien

<400> 56

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gctcctcttg ccttaccaac acattctcaa aaacctgtta gagtectaag cattctcctg      60
ttagtattgg gattttaccc ctgtcctata aagatgttat gtaccaaaaa tgaagtggag     120
ggccataccc tgagggaggg gagggatctc tagtgttgtc agaagcggaa gctca          175

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<210> 57

<211> 223

<212> DNA

<213> Homo sapien

<400> 57

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agccatttac caccatgga tgaatggatt ttgtaattct agctgttgta ttttgtgaat      60
ttgttaattt tgttgTTTTT ctgtgaaaca catacattgg atatgggagg taaaggagtg     120
tcccagttgc tcttggtcac tccctttata gccattactg tcttgtttct tgtaactcag     180
gttaggtttt ggtctctctt gctccactgc aaaaaaaaaa aaa                      223

```

<210> 58

<211> 211

<212> DNA

<213> Homo sapien

<400> 58

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gttcgaaggt gaacgtgtag gtagcggatc tcacaactgg ggaactgtca aagacgaatt      60
aactgacttg gatcaatcaa atgtgactga ggaaacacct gaaggtgaag aacatcatcc     120
agtggcagac actgaaaata aggagaatga agttgaagag gtaaaagagg aggggtccaaa     180
agagatgact ttggatgggt ggtaaatggc t                                     211

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<210> 59
 <211> 208
 <212> DNA
 <213> Homo sapien

<400> 59
 gtcctctttg ccttaaccaac ttgacacca tcatcaacca tgtggccagg ttgcagccc 60
 aggtgcaca tcaggggact gctcgcaat acttcattgt gttgctgtg actgatggg
 120ctgtgacgga tgtggaagcc acacgtgagg ctgtgggtgcg tgctcgaac ctgcccattg
 180
 cagtgatcat tatgggttgt aaatggct 208

<210> 60
 <211> 171
 <212> DNA
 <213> Homo sapien

<400> 60
 agccatttac caccataact aaattctagt tcaaactcca acttcttcca taaaacatct 60
 aaccactgac accagttggc aatagcttct tcttcttcta acctcttaga gtatttatgg 120
 tcaatgccac acatttctgc aactgaataa agttggttaag gcaagaggag c 171

<210> 61
 <211> 134
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(134)
 <223> n = A,T,C or G

<400> 61
 cgggtgatgc ctctcaggc ttggtgtgt ccactcnact cactggcctc ttctccagca 60
 actggtgaan atgtctcan gaaaancncc acacgcnct cagggtgggg tgggaancat 120
 canaatcatc nggc 134

<210> 62
 <211> 145
 <212> DNA
 <213> Homo sapien

<400> 62
 agagggtaca tatgcaacag tatataaagg aagaagtgca ctgagaggaa ctcatcaag 60
 gccatttaac caataagtga tagagtcaag gctcaaccca ggtgtgacgg attccaggtc 120
 ccaagctcct tactggtacc ctctt 145

<210> 63
 <211> 297
 <212> DNA
 <213> Homo sapien

<400> 63
 tgcactgaga ggaattcaaa ggggttatgc caaagaacaa accagtcctc tgcagcctaa 60
 ctcatctgtt ttgggctgc gaagccatgt agaggcgat caggcagtag atggtcctc 120

ccacagtcag cgccatgggtg gtccggtaaa gcatttggtc aggcaggcct cgtttcaggt 180
 agacggggcac acatcagctt tctggaaaaa cttttgtagc tctggagctt tgtttttccc 240
 agcataatca tacactgtgg aatcggaggt cagtttagtt ggtaaggcaa gaggagc 297

<210> 64

<211> 300

<212> DNA

<213> Homo sapien

<400> 64

gcactgagag gaacttccaa tactatgttg aataggagtg gtgagagagg gcacccctgt 60
 cttgtgccgg ttttcaaagg gaatgttcc agcttttgcc cattcagtat aatattaaag 120
 aatgttttac cttttctgt cttgcctgtt tttctgtgtt tttgttggtc ttttcattct 180
 ccatttttag gcctttacat gttaggaata tatttctttt aatgatactt cacctttggt 240
 atcttttgtg agactctact catagtgtga taagcactgg gttggtaagg caagaggagc 300

<210> 65

<211> 203

<212> DNA

<213> Homo sapien

<400> 65

gctcctcttg ccttaccac tcacccagta tgcagcaat tttatcrgct ttacctacga 60
 aacagcctgt atccaaacac ttaacacact cacctgaaaa gttcaggcaa caatcgctt 120
 ctcattgggtc tctctgtctc agttctgaac ctttctcttt tcttagaaca tgcatttarg 180
 tcgatagaag ttcctctcag tgc 203

<210> 66

<211> 344

<212> DNA

<213> Homo sapien

<400> 66

tacggggacc cctgcattga gaaagcgaga ctcaactctga agctgaaatg ctgttgccct 60
 tgcagtgttg gtagcaggag ttctgtgctt tgtgggctaa ggctcctgga tgacctctga 120
 catggagaag gcagagttgt gtgccccttc tcatggcctc gtcaaggcat catggactgc 180
 cacacacaaa atgccgtttt tattaacgac atgaaattga aggagagaac acaattcact 240
 gatgtggctc gtaaccatgg atatgggtcac atacagaggt gtgattatgt aaagggttaat 300
 tccaccaccc tcatgtggaa actagcctca atgcaggggt ccca 344

<210> 67

<211> 157

<212> DNA

<213> Homo sapien

<400> 67

gcactgagag gaacttcgta gggaggttga actggctgct gaggaggggg aacaacaggg 60
 taaccagact gatagcatt ggatggataa tatgggtggt gaggagggac actacttata 120
 gcagaggggt gtgtatagcc tgaggaggca tcaccgg 157

<210> 68

<211> 137

<212> DNA

<213> Homo sapien

<400> 68

gcactgagag gaacttctag aaagtgaaag tctagacata aaataaaata aaaattttaa 60
adtcaggaga gacagccag cacggtggct cagcctgta atccagaac ttggggagcc 120
tgaggaggca tcacccg 137

<210> 69

<211> 137

<212> DNA

<213> Homo sapien

<400> 69

cggtgatgc ctctcaggc tgtatttga agactatcga ctggacttct tatcaactga 60
agaatccgtt aaaaatacca gttgtattat ttctacctgt caaaatccat ttcaaagt 120
gaagttcttc tcagtgc 137

<210> 70

<211> 220

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1) ... (220)

<223> n = A,T,C or G

<400> 70

agcatgttga gccagacac gcaatctgaa tgagtgtgca cctcaagtaa atgtctacac 60
gtgctctggt ctgacatggc acaccatcnc gtggaggggca casctctgct cngcctacwa 120
cgagggcant ctcatwgaca ggttccaccc accaaactgc aagaggctca nnaagtactr 180
ccaggggtmya sggacmasgg tgggaytyca ycacwcatct 220

<210> 71

<211> 353

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1) ... (353)

<223> n = A,T,C or G

<400> 71

cgttagggtc tctatccact gctaaacct acacctgggt aaacaggga cttttaacat 60
tcccantaa atatgccaaag tgacttcaca tgtttatctt aaagatgtcc aaaacgcaac 120
tgattttctc cctaaacct gtgatgggtg gatgattaan cctgagtggc ctacagcaag 180
ttaagtgcaa ggtgctaaat gaangtgacc tgagatacag catctacaag gcagtacctc 240
tcaacncagg gcaactttgc ttctcanagg gcatttagca gtytctgaag taatttctgt 300
attacaactc acggggcggg ggggtgaatat ctantggana gnagacccta acg 353

<210> 72

<211> 343

<212> DNA

<213> Homo sapien

<400> 72

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gcactgagag gaacttccaa tacyatkatc agagtgaaca rgcarccyac agaacaggag      60
aaaatgttyg caatctctcc atctgacaaa aggctaatat ccagawtcta awaggaactt      120
aaacaaattht atgagaaaaag aacaracaac ctcaawcaaaa agtgggtgaa ggawatgcts      180
aaargaagac atytattcag ccagtaaaqa yatgaaaaaa aggctcatsa tcactgawca      240
ttagagaaat gcaaatcaaa accacaatga gataccatct yayrccagtt agaaygggtga      300
tcattaaaaar stcaggaaac aacagatgct ggacaagggtg tca                        343

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<210> 73

<211> 321

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1) ... (321)

<223> n = A,T,C or G

<400> 73

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gcactgagag gaacttcaga gagagagaga gagttccacc ctgtacttgg ggagagaaac      60
agaagggtgag aaagtctttg gttctgaagc agcttctaag atcttttcat ttgcttcatt      120
tcaaagttcc catgctgcc aagtgccatc ctttggggta ctgttttctg agctccagtg      180
ataactcatt tatacaaggg agatacccag aaaaaaagtg agcaaactctt aaaaagggtgg      240
cttgagttca gccttaaata ccatcttgaa atgacacaga gaaagaanga tgttgggtgg      300
gagtggtatag agaccctaac g                                              321

```

<210> 74

<211> 321

<212> DNA

<213> Homo sapien

<400> 74

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gcactgagag gaacttcaga gagagagaga gagttccacc ctgtacttgg ggagagaaac      60
agaagggtgag aaagtctttg gttctgaagc agcttctaag atcttttcat ttgcttcatt      120
tcaaagttcc catgctgcc aagtgccatc ctttggggta ctgttttctg agctccagtg      180
ataactcatt tatacaaggg agatacccag aaaaaaagtg agcaaactctt aaaaagggtgg      240
cttgagttca gycttaaata ccatcttgaa atgamacaga gaaagaagga tgttgggtgg      300
gagtggtatag agaccctaac g                                              321

```

<210> 75

<211> 317

<212> DNA

<213> Homo sapien

<400> 75

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gcactgagag gaacttccac atgcactgag aaatgcatgt tcacaaggac tgaagtctgg      60
aactcagttt ctcaagttcca atcctgattc aggtgtttac cagctacaca accttaagca      120
agtcagataa ccttagcttc ctcatatgca aaatgagaat gaaaagtact catcgctgaa      180
ttgttttgag gattagaaaa acatctggca tgcagtagaa attcaattag tattcatttt      240
cattcttcta aattaaacaa ataggatttt tagtggtgga acttcagaca ccagaaatgg      300
gagtggtatag agaccctt                                              317

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<210> 76

<211> 244

<212> DNA

<213> Homo sapien

<400> 76

cgttagggtc	tctatccact	cccactactg	atcaaactct	atttatttaa	ttatttttat	60
catactttta	gttctgggat	acaagtgcag	catgcgcagg	tttgttgcat	aggtatacac	120
ttgccatggt	ggtttgetgc	acccatcagt	ccatcatcta	cattaggtat	ttctccta	180
gctatccctc	ccctagcccc	ttacaccccc	aacaggctct	agtgtgtgaa	gttcctctca	240
gtgc						244

<210> 77

<211> 254

<212> DNA

<213> Homo sapien

<400> 77

cgttagggtc	tctatccact	gaaatctgaa	gcacaggagg	aagagaagca	gtyctagtga	60
gatggcaagt	tcwtttacca	cactctttta	catttygttt	agttttaacc	tttatttatg	120
gataataaag	gttaatatta	ataatgattt	attttaagga	attcccraat	ttgcataatt	180
ctccttttgg	agataccctt	ttatctccag	tgcaagtctg	gatcaaagtg	atasamagaa	240
gttcctctca	gtgc					254

<210> 78

<211> 355

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1) ... (355)

<223> n = A, T, C or G

<400> 78

ttcgatacag	gcaaacatga	actgcaggag	ggtggtgacg	atcatgatgt	tgccgatggt	60
ccggatggnc	acgaagacgc	actggancac	gtgettaegt	ccctttgtct	tggtgatggc	120
cctgagggga	cgcaggaccc	ttatgacctt	cagaatcttc	acaacgggag	atggcactgg	180
attgantccc	antgacacca	gagacacccc	aaccaccagn	atatcantat	attgatgtag	240
ttcctgtaga	nggccccctt	gtggaggaaa	gtcccatnag	ttggatcatc	tcaacaggat	300
ctcaacagtt	tccgatggct	gtgatgggca	tagtcatant	taaccntgtn	tcgaa	355

<210> 79

<211> 406

<212> DNA

<213> Homo sapien

<400> 79

taagagggtta	ccagcagaaa	ggttagtatc	atcagatagc	atcttatacg	agtaatatgc	60
ctgctatttg	aagtgttaatt	gagaaggaaa	atttttagcgt	gtcactgac	ctgcctgtag	120
ccccagtga	agctaggatg	tgcatctctc	agccatcaag	agactgagtc	aagttgttcc	180
ttaagtcaga	acagcagact	cagctctgac	attotgatcc	gaatgacact	gttcaggaat	240
cggaatcctg	tegattagac	tggaacagctt	gtggcaagtg	aatttgccctg	taacaagcca	300
gattttttta	aatttatatt	gtaaataatg	tgtgtgtgtg	tgtgtgtata	tatatatata	360
tgtacagtta	tctaagttaa	tttaaaagtt	gtttgggtacc	ctctta		406

<210> 80

<211> 327

<212> DNA

<213> Homo sapien

<400> 80

tttttttttt tttactcggc tcagtctaata cttttttgta gtcactcata ggccagactt	60
agggctagga tgatgattaa taagagggat gacataacta ttagtggcag gttagttgtt	120
tgtagggctc atggtagggg taaaaggagg gcaatttcta gatcaaataa taagaaggta	180
atagctacta agaagaattt tatggagaaa gggacgcggg cgggggatat agggtcgaag	240
cgcactcgt aaggggtgga tttttctatg tagccgttga gttgtggtag tcaaatgta	300
ataattatta gtagtaagcc taggaga	327

<210> 81

<211> 318

<212> DNA

<213> Homo sapien

<400> 81

tagtctatgc ggttgattcg gcaatccatt atttgcctgga tttgtcatg tgttttgcca	60
attgcattca taatttatta tgcatttatg cttgtatctc ctaagtcag gttatataatc	120
catgcttttt atgttttgc tgacataaac tcttatcaga gccctttgca cacagggatt	180
caataaatat taacacagtc tacatttatt tggatgaatat tgcatactg ctgtactgaa	240
agcacattaa gtaacaaagg caagtgaagaa gaatgaaaag cactactcac aacagttatc	300
atgattgcgc atagacta	318

<210> 82

<211> 338

<212> DNA

<213> Homo sapien

<400> 82

tcttcaacct ctactccac taatagcttt ttgatgactt ctaccaaaggc togctaacct	60
cgccttacct cccactatta acctactggg agaactctct ggcctagtaa ccaagttctc	120
ctgatcaaat atcactctcc tacttacagg actcaacata ctagtcacag ccctatactc	180
cctctacata ttaccacaaa cacaatgggg ctactcacc caccacatta acaacataaa	240
acctcattc acacgagaaa acacctcat gttcatacac ctatccccca ttctcctcct	300
atccctcaac cccgacatca ttaccgggtt ttctctct	338

<210> 83

<211> 111

<212> DNA

<213> Homo sapien

<400> 83

agccatttac caccatcca caaaaaaaaa aaaaaaaaaag aaaaatatca aggaataaaa	60
atagactttg aacaaaaagg aacatttgct ggcctgagga ggcattaccc g	111

<210> 84

<211> 224

<212> DNA

<213> Homo sapien

<400> 84

tgggtgatg cctcctcagg ccaagaagat aaagcttcag acccctaaca catttccaaa	60
aaggaagaaa ggagaaaaaa gggcatcatc cccgttccga agggtcaggg aggaggaaat	120
tgaggtggat tcacgagttg cggacaactc ctttgatgcc aagcgaggtg cagccggaga	180
ctggggagag cgagccaatc aggttttgaa gttcctctca gtgc	224

<210> 85
<211> 348
<212> DNA
<213> Homo sapien

<400> 85

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gcactgagag gaacttcggt ggaaacgggt ttttttcattg taaggctaga cagaagaatt      60
ctcagtaact tccttggtgt gtgtgtattc aactcacasa gttgaacgat cctttacaca      120
gagcagactt gtaacactct twttgtggaa ttgcaagtg gagatttcag scgctttgaa      180
gtsaaaggta gaaaaggaaa tatcttccta taaaaactag acagaatgat tctcagaaac      240
tcctttgtga tgtgtgcgtt caactcacag agtttaacct ttcwtttcat agaagcagtt      300
aggaaacact ctgtttgtaa agtctgcaag tggatagaga ccctaacg      348
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<210> 86
<211> 293
<212> DNA
<213> Homo sapien

<400> 86

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gcactgagag gaacttcytc gtgwtgktg yattcaactc acagagttga asswtsmttt      60
acabagwkca ggcttkcaaa cactcttttt gtmgatytg caagwggaka tttstrccrc      120
tttgwggycw wysktmgaaw mgtgrwatat ttcwyatmra amctagacag aaksattctc      180
akaawstyyy ytgtgawgws tgcrttcaac tcacagagkt kaacmwtct kytsatrgag      240
cagttwkgaa actctmtttc tttggattct gcaagtggat agagacccta acg      293
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<210> 87
<211> 10
<212> DNA
<213> Artificial Sequence

<220>

<223> Primer for amplification from breast tumor cDNA

<400> 87

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ctcctaggct      10
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<210> 88
<211> 10
<212> DNA
<213> Artificial Sequence

<220>

<223> Primer for amplification from breast tumor cDNA

<400> 88

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agtagttgcc      10
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<210> 89
<211> 11
<212> DNA
<213> Artificial Sequence

<220>

<223> Primer for amplification from breast tumor cDNA

<400> 89
ttcogttatg c 11

<210> 90
<211> 10
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer for amplification from breast tumor cDNA

<400> 90
tggtaaaggg 10

<210> 91
<211> 10
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer for amplification from breast tumor cDNA

<400> 91
tcggtcatag 10

<210> 92
<211> 10
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer for amplification from breast tumor cDNA

<400> 92
tacaacgagg 10

<210> 93
<211> 10
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer for amplification from breast tumor cDNA

<400> 93
tggattggtc 10

<210> 94
<211> 10
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer for amplification from breast tumor cDNA

<400> 94
ctttctaccc 10

<210> 95
<211> 10
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer for amplification from breast tumor cDNA

<400> 95
ttttggctcc 10

<210> 96
<211> 10
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer for amplification from breast tumor cDNA

<400> 96
ggaaccaatc 10

<210> 97
<211> 10
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer for amplification from breast tumor cDNA

<400> 97
tcgatacagg 10

<210> 98
<211> 10
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer for amplification from breast tumor cDNA

<400> 98
ggtactaagg 10

<210> 99
<211> 10
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer for amplification from breast tumor cDNA

<400> 99

agtctatgcg

10

<210> 100

<211> 10

<212> DNA

<213> Artificial Sequence

<220>

<223> Primer for amplification from breast tumor cDNA

<400> 100

ctatccatgg

10

<210> 101

<211> 10

<212> DNA

<213> Artificial Sequence

<220>

<223> Primer for amplification from breast tumor cDNA

<400> 101

tctgtccaca

10

<210> 102

<211> 10

<212> DNA

<213> Artificial Sequence

<220>

<223> Primer for amplification from breast tumor cDNA

<400> 102

aagagggtac

10

<210> 103

<211> 10

<212> DNA

<213> Artificial Sequence

<220>

<223> Primer for amplification from breast tumor cDNA

<400> 103

cttcaacctc

10

<210> 104

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Primer for amplification from breast tumor cDNA

<400> 104
gctcctcttg ccttaccaac 20

<210> 105
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer for amplification from breast tumor cDNA

<400> 105
gtaagtcgag cagtgtgatg 20

<210> 106
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer for amplification from breast tumor cDNA

<400> 106
gtaagtcgag cagtctgatg 20

<210> 107
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer for amplification from breast tumor cDNA

<400> 107
gacttagtgg aaagaatgta 20

<210> 108
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer for amplification from breast tumor cDNA

<400> 108
gtaattccgc caaccgtagt 20

<210> 109
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer for amplification from breast tumor cDNA

<400> 109
atggttgatc gatagtggaa 20

<210> 110
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer for amplification from breast tumor cDNA

<400> 110
acgggggaccc ctgcattgag 20

<210> 111
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer for amplification from breast tumor cDNA

<400> 111
tattctagac cattcgctac 20

<210> 112
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer for amplification from breast tumor cDNA

<400> 112
acataaccac tttagcgttc 20

<210> 113
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer for amplification from breast tumor cDNA

<400> 113
cgggtgatgc ctctcagc 20

<210> 114
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer for amplification from breast tumor cDNA

<400> 114
agcatgttga gcccagacac 20

<210> 115
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer for amplification from breast tumor cDNA

<400> 115
gacaccttgt ccagcatctg 20

<210> 116
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer for amplification from breast tumor cDNA

<400> 116
tacgctgcaa cactgtggag 20

<210> 117
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer for amplification from breast tumor cDNA

<400> 117
cgttagggtc tctatccact 20

<210> 118
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer for amplification from breast tumor cDNA

<400> 118
agactgactc atgtccccta 20

<210> 119
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer for amplification from breast tumor cDNA

<400> 119
tcacgcgctcg gtgactcaag

20

<210> 120
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer for amplification from breast tumor cDNA

<400> 120
caagattcca taggctgacc

20

<210> 121
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer for amplification from breast tumor cDNA

<400> 121
acgtactggc cttgaaggtc

20

<210> 122
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer for amplification from breast tumor cDNA

<400> 122
gacgcttggc cacttgacac

20

<210> 123
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer for amplification from breast tumor cDNA

<400> 123
gtatcgacgt agtggctctcc

20

<210> 124
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer for amplification from breast tumor cDNA

<400> 124
tagtgacatt acgacgctgg 20

<210> 125
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer for amplification from breast tumor cDNA

<400> 125
cgggtgatgc ctcctcaggc 20

<210> 126
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer for amplification from breast tumor cDNA

<400> 126
atggetattt tcgggggctg aca 23

<210> 127
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer for amplification from breast tumor cDNA

<400> 127
ccggtatctc ctcgtaggta tt 22

<210> 128
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer for amplification from breast tumor cDNA

<400> 128
ctgcctgagc cacaaatg 18

<210> 129
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer for amplification from breast tumor cDNA

<400> 129
ccggaggagg aagctagagg aata 24

<210> 130
<211> 14
<212> DNA
<213> Artificial Sequence
<220>
<223> Primer

<400> 130
tttttttttt ttag 14

<210> 131
<211> 18
<212> PRT
<213> Artificial Sequence
<220>
<223> Predicited Th Motifs (B-cell epitopes)

<400> 131
Ser Ser Gly Gly Arg Thr Phe Asp Asp Phe His Arg Tyr Leu Leu Val
1 5 10 15
Gly Ile

<210> 132
<211> 22
<212> PRT
<213> Artificial Sequence
<220>
<223> Predicited Th Motifs (B-cell epitopes)

<221> VARIANT
<222> (1)...(22)
<223> Xaa = Any Amino Acid

<400> 132
Gln Gly Ala Ala Gln Lys Pro Ile Asn Leu Ser Lys Xaa Ile Glu Val
1 5 10 15
Val Gln Gly His Asp Glu
20

<210> 133
<211> 23
<212> PRT
<213> Artificial Sequence
<220>
<223> Predicited Th Motifs (B-cell epitopes)

Ser Pro Gly Val Phe Leu Glu His Leu Gln Glu Ala Tyr Arg Ile Tyr
1 5 10 15
Thr Pro Phe Asp Leu Ser Ala
20

<211> 9

<212> PRT

<213> Artificial Sequence

<220>

<223> Predicited HLA A2.1 Motifs (T-cell epitopes)

Tyr Leu Leu Val Gly Ile Gln Gly Ala
1 5

<210> 135

<211> 9

<212> PRT

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<221> misc_feature

<222> (1) ... (579)

<223> n = A, T, C or G

<400> 147

tagcatgttg	agccagaca	ctgggcagcg	gggggtggcca	cggcagctcc	tgccgagccc	60
aagcgtgttt	gtctgtgaag	gacctgacg	tcacctgcca	ggctagggag	gggtcaatgt	120
ggagtgaatg	ttcaccgact	ttcgaggag	tgtgcagaag	ccaggtgcaa	cttggtttgc	180
ttgtgttcat	cacccctcaa	gatatgcaca	ctgctttcca	aataaagcat	caactgtcat	240
ctccagatgg	ggaagacttt	ttctccaacc	agcaggcagg	tccccatcca	ctcagacacc	300
agcacgtcca	ccttctcggg	cagcaccacg	tcttccacct	tctgctggta	cacgggtgatg	360
atgtcagcaa	agccgtttctg	cangaccagc	tgccccgtgt	gctgtgccat	ctcactggcc	420
tccaccgctg	acaccgctct	aggccgcgca	tantgtgcac	agaanaaatg	atgatccagt	480
cccacagccc	acgtccaaga	ngactttatc	cgtcagggat	tctttattct	gcaggatgac	540
ctgtggtatt	aattgttcgt	gtctgggctc	aacatgcta			579

<210> 148

<211> 249

<212> DNA

<213> Homo sapien

<400> 148

tgacaccttg	tccagcatct	gcaagccagg	aagagagctc	tcaccaagat	ccccaccccg	60
ttggcaccag	gatcttggac	ttccaatctc	cagaactgtg	agaaataagt	atttgtcgct	120
aaataaatct	ttgtggtttc	agatatctag	ctatagcaga	tcaggctgac	taagagaaac	180
cccataagag	ttacatactc	attaatctcc	gtctctatcc	ccaggctctca	gatgctggac	240
aaggtgtca						249

<210> 149

<211> 255

<212> DNA

<213> Homo sapien

<400> 149

tgacaccttg	tccagcatct	gctatcttct	gactttttta	taatagccat	tctgactggg	60
gtgagatggg	aactcattgt	gggtttgggc	tgcatttctc	taatgatcag	tgatattaag	120
ctttttttta	atatgcttct	tgaccacatg	tatatcatct	tttgagaagt	gtctgttcat	180
atcctttgcc	cactttttta	tttttttata	ttgtaaattt	gtttaatttc	cttacagatg	240
ctggacaagg	tgta					255

<210> 150

<211> 318

<212> DNA

<213> Homo sapien

<400> 150

ttacgctgca	acactgtgga	ggccaagctg	ggatcacttc	ttcattctaa	ctggagagga	60
gggaagttca	agtccagcag	agggtgggtg	ggtagacagt	ggcactcaga	aatgtcagct	120
ggacccctgt	ccccgcatag	gcaggacagc	aaggctgtgg	ctctccaggg	ccagctgaag	180
aacaggacac	tgtctccgct	gccacaaagc	gtcagagact	cccactcttg	aagcacggcc	240
ttcttggctc	tctgtcactt	ccctgttctg	ttagagacct	ggttatagac	aaggcttctc	300
cacagtgttg	cagcgtaa					318

<210> 151

<211> 323

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(323)

<223> n = A,T,C or G

<400> 151tnacgngcn acnntgtaga ganggnaagg cnttccccac attnccccctt
catnanagaa 60
ttattcnacc aagnntgacc natgcenntt atgacttaca tgcnnactnc ntaatctgtn 120
tcnngcetta aaagcnntc cactacatgc ntcancactg tntgtgtnac ntcatnaact 180
gtcngnaata ggggncata actacagaaa tgcanttcac actgcttcca ntgccatcng 240
cgtgtggcct tncctactct tcttntattc caagtagcat ctctggantg cttccocact 300
ctccacattg ttgcagcnat aat 323

<210> 152

<211> 311

<212> DNA

<213> Homo sapien

<400> 152

tcaagattcc ataggctgac cagtccaagg agagttgaaa tcatgaagga gagtctatct 60
ggagagagct gtagttttga gggttgcaaa gacttaggat ggagttggtg ggtgtggtta 120
gtctctaagg ttgattttgt tcataaattt catgccctga atgccttgct tgcctcacc 180
tggtccaagc cttagtgaac acctaaaagt ctctgtcttc ttgctctcca aacttctcct 240
gaggatttcc tcagattgtc tacattcaga tcgaagccag ttggcaaaaca agatgcagtc 300
cagaggggtca g 311

<210> 153

<211> 332

<212> DNA

<213> Homo sapien

<400> 153

caagattcca taggctgacc aggaggtat tcaagatctc tggcagttga ggaagtctct 60
ttaagaaaat agtttaaaca atttgtaaa atttttctgt cttacttcat ttctgtagca 120
gttgatatct ggctgtcctt tttataatgc agagtgggaa ctttccctac catgtttgat 180
aaatgttgtc caggctccat tgccaataat gtgtgtgcca aaatgctgtt ttagttttta 240
aagacggaac tccaccctt gcttggtctt aagtatgtat ggaatgttat gataggacat 300
agtagtagcg gtggtcagcc tatggaatct tg 332

<210> 154

<211> 345

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(345)

<223> n = A,T,C or G

<400> 154

tcaagattcc ataggctgac ctggacagag atctcctggg tctggcccag gacagcaggc 60
tcaagctcag tggagaaggc ttccatgacc ctcagattcc cccaaacctt ggattgggtg 120
acattgcac tcctcagaga gggaggagat gtangtctgg gcttccacag ggaacctgta 180

ttttaggatc aggggtaccgc tggcctgagg cttggatcat tcanagcctg ggggtggaat	240
ggctggcagc ctgtggcccc attgaaatag gctctggggc actccctctg ttctanttg	300
aacttgggta aggaacagga atgtgggtcan cctatggaat cttga	345

<210> 155
 <211> 295
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1) ... (295)
 <223> n = A,T,C or G

<400> 155	
gacgcttggc cacttgacac attaaacagt tttgcataat cactancatg tatttctagt	60
ttgctgtctg ctgtgatgcc ctgccctgat tctctggcgt taatgatggc aagcataatc	120
aaacgctggt ctgttaattc caagttataa ctggcattga ttaaagcatt atctttcaca	180
actaaactgt tcttcatana acagcccata ttattatcaa attaagagac aatgtattcc	240
aatatccttt anggccata tatttnatgt ccttaatta agagctactg tccgt	295

<210> 156
 <211> 406
 <212> DNA
 <213> Homo sapien
 <220>
 <221> misc_feature
 <222> (1) ... (406)
 <223> n = A,T,C or G

<400> 156	
gacgcttggc cacttgacac tgcagtggga aaaccagcat gagccgctgc ccccaaggaa	60
cctcgaagcg caggcagagg accagccatc ccagcctgca ggtaaagtgt gtcacctgtc	120
aggtgggctt ggggtgagtg ggtgggggaa gtgtgtgtgc aaagggggtg tnaatgtnta	180
tgcgtgtgag catgagtgat ggctagtgtg actgcatgtc agggagtgtg aacaagcgtg	240
cgggggtgtg tbtgcaagtg cgtatgcata tgagaatatg tgtctgtgga tgagtgcatt	300
tgaaagtctg tgtgtgtgcg tgtggtcatg anggtaantt antgactgag caggatgtgt	360
gagtgtgcat ggaacactca ntgtgtgtgt caagtggccn ancgtc	406

<210> 157
 <211> 208
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1) ... (208)
 <223> n = A,T,C or G

<400> 157	
tgacgcttgg ccacttgaca cactaaaggg ttttactcat cactttcttc tctcctcggt	60
ggcatgtgag tgcatttatt cacttggcac tcatttgttt ggcagtgact gtaanccana	120
tctgatgcat acaccagctt gtaaattgae taaatgtctc taatactatg tgctcacaat	180
anggtanggg tgaggagaag gggagaga	208

<210> 158
 <211> 547
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(547)
 <223> n = A,T,C or G

<400> 158
 cttcaacctc cttcaacctc cttcaacctc ctggattcaa acaatcatcc cacctcagac 60
 tccttagtag ctgagactac agactcacgc cactacatct ggctaaattt ttgtagagat 120
 agggtttcat catgttgccc tggctggctt caaactcctg acctcaagca atgtgccac 180
 ctcagcctcc caaagtgctg ggattacagg cataagccac catgccagc ccatntttaa 240
 tctttcctac cacattctta ccacacttct ttttatgttt agatacataa atgcttacca 300
 ttatgataca attgcccaaca gtattaagac agtaacatgc tgcacagggt tgtagcctag 360
 gaacagtagg caataccaca tagcttaggt gtgtggtaga ctataccatc taggtttgtg 420
 taagttacac tttatgctgt ttacacaatg acaaaaccat ctaatgatgc atttctcaga 480
 atgtatcctt gtcagtaagc tatgatgtac aggaacact gcccaaggac acagatattg 540
 tacctgt 547

<210> 159
 <211> 203
 <212> DNA
 <213> Homo sapien

<400> 159
 gctcctcttg ccttaccac tcacccagta tgtcagcaat tttatcrgct ttacctacga 60
 aacagcctgt atccaaacac ttaacacact cacctgaaaa gttcaggcaa caatgcctt 120
 ctcatgggtc tctctgctcc agttctgaac ctttctcttt tcttagaaca tgcatttarg 180
 tcgatagaag ttcctctcag tgc 203

<210> 160
 <211> 402
 <212> DNA
 <213> Homo sapien

<400> 160
 tgtaagtcga gcagtgtgat ggggtggaaca ggggtgtaag cagtaattgc aaactgtatt 60
 taaacaataa taataatatt tagcatttat agagcacttt atatcttcaa agtacttgca 120
 aacattayct aattaaatac cctctctgat tataatctgg atacaaatgc acttaaaactc 180
 aggacagggt catgagaraa gtatgcattt gaaagtgggt gctagctatg ctttaaaaac 240
 ctatacaatg atgggraagt tagagtccag attctgttgg actgtttttg tgcatttcag 300
 ttcagcctga tggcagaatt agatcatatc tgcactcgat gactytgctt gataacttat 360
 cactgaaatc tgagtgttga tcatcacact gctcgactta ca 402

<210> 161
 <211> 193
 <212> DNA
 <213> Homo sapien

<400> 161
 agcatgttga gccagacac tgaccaggag aaaaaccaac caatagaac acgccagac 60

```
<210> 162
<211> 147
<212> DNA
<213> Homo sapien
```

```

<400> 162
tggtgagccc agacactgac caggagaaaa accaaccaat aaaaacaggc ccggacataa    60
gacaaataat aaaattagcg gacaaggaca tgaaaacagc tattgtaaga gcggatatag    120
tggtgtgtgt ctggggtcaa catgcta                                     147

```

<210> 163
<211> 294
<212> DNA
<213> Homo sapien

<400> 163						
tagcatgttg	agccagaca	caaatctctc	ctraagcaat	aaatcatttc	tgcatatggt	60
tttaaaacca	cagctaagcc	atgattattc	aaaaggacta	ttgtattggg	tattttgatt	120
tgggttctta	tctccctcac	attatcttca	tttctatcat	tgacctotta	tcccagagac	180
tctcaaactt	ttatgttata	caaatcacat	tctgtctcaa	aaaatatctc	accacttct	240
cttctgtctc	tgcggtgtga	tgtgtgtgtg	tgtgtgtctg	ggctcaacat	gcta	294

```
<210> 164
<211> 412
<212> DNA
<213> Homo sapien
<220> misc_feature
<221> misc_feature
<222> (1)...(412)
<223> n = A,T,C or G
```

<400> 164					
cgggattggc	tttgagctgc	agatgctgcc	tgtgaccgca	cccgggcgtgg	aacagaaagc 60
cacctggctg	caagtgcgcc	agagccgccc	tgactacgtg	ctgctgtggg	gctggggcgt 120
gatgaactcc	accgccctga	aggaagccca	ggccaccgga	tacccccgcg	acaagatgta 180
cggcgtgtgg	tgggcccgtg	cggagcccg	tgtgcgtgac	gtggggcgaag	gcyccaaggg 240
ctacaacgcg	ctggctctga	acggctacgg	cacgcagtc	aaygtgatcc	angacatcct 300
gaaacacgtg	cacgcacaagg	gccagggcac	ggggcccaaa	gacgaagtgg	gctcggtgct 360
gtacacccgc	ggcgtgatca	tccagatgct	ggacaagggtg	tcaatcacta	at 412

<210> 165
<211> 361
<212> DNA
<213> Homo sapien

<400> 165						
ttgacacctt	gtccagcctc	tgcctctgat	gagagcctca	gatggctacc	actaatggca	60
gaaggcaaag	gagaacaggc	attgtatggc	aagaaaggaa	gaaagagaga	ggggagaaag	120
gtgctagggt	cttttcaaca	accagttctt	gatggaaactg	agagtaagag	ctcaaggcca	180
ggtgtggtga	ctccaaccag	taatccaac	atttttaggag	gctgagggcag	gcagatgtct	240

```

tgaccccatg agtttgtgac cagcctgaac aacatcatga gactccatct ctacaataat    300
tacaaaaatt aatcaggcat tgtgggtatgc cctgtagtcc cagatgctgg acaagggtgc    360
a                                                                    361

```

<210> 166

<211> 427

<212> DNA

<213> Homo sapien

<400> 166

```

twgactgact catgtccctt acacccaact atcttctcca ggtggccagg catgatagaa    60
tctgatectg acttagggga atattttctt tttacttccc atcttgattc cctgccgggtg   120
agtttctctg ttcagggtaa gaaaggagct caggccaaag taatgaacaa atccatcctc   180
acagacgtac agaataagag aacwtggacw tagccagcag aacmcaaktg aaamcagaac   240
mcttamctag gatracaamc merraratat ktgcycmcmc wtataataga aaccaaaactt   300
gtatctaatt aaatatattat ccacygtcag ggcattagtg gttttgataa atacgctttg   360
gctaggattc ctgagggttag aatggaaraa caattgcamc gagggtaggg gacatgagtc   420
aktctaa                                           427

```

<210> 167

<211> 500

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(500)

<223> n = A,T,C or G

<400> 167

```

aacgtcgcat gctcccgcc gccatggccg cgggatagac tgactcatgt cccctaagat    60
agaggagaca cctgctaggt gtaaggagaa gatggttagg tctacggagg ctccagggtg   120
ggagtagttc cctgctaagg gagggtagac tgttcaacct gttcctgctc cggcctccac   180
tatagcagat gcgagcagga gtaggagaga gggaggtaag agtcagaagc ttatgttggt   240
tatgcgggga aacgcrtat cgggggcagc cragttatta ggggacantg tagwyartcw   300
agntagcatc caaagcngg gagttntccc atatgggttg acctgcaggc ggccgcatta   360
gtgattagca tgtgagcccc agacacgcac agcaacaagg acctaaactc agatcctgtg   420
ctgattactt aacatgaatt attgtattta tttaaactt ttgagttatg agycatatta   480
ttaggtccat attacctgga                                           500

```

<210> 168

<211> 358

<212> DNA

<213> Homo sapien

<400> 168

```

ttcatcgctc ggtgactcaa gcctgtaatc ccagaacttt gggaggccga ggggagcaga    60
tcacctgagg ttgggagttt gagaccagcc tggccaacat ggtgacaacc cgtctctgct   120
aaaaatacaa aaattagcca agcatggttg catgcacttg taatcccagc tactcggggag   180
gctgaggcag gagaatcact tgaggccagg aggcagaggt tgcagtgagg cagagggttg   240
gatcatgcca ctgcactcca gcctgggcaa cagagtaaga ctccatctca aaaaaaaaaa   300
aaaaaaaaaa tgatcagagc cacaaatata gaaaaacttg agtcaccgag cgatgaau     358

```

<210> 169

<211> 1265

<212> DNA

<213> Homo sapien

<400> 169

ttctgtccac	accaatctta	gagctctgaa	agaatttgtc	tttaaataac	ttttaatagt	60
aacatgtatt	ttatggacca	aattgacatt	ttcgactatt	ttttcccaaa	aaaagtcagg	120
tgaattttcag	cacactgagt	tgggaatttc	ttatccaga	agwccgcacg	agcaatttca	180
tattttattta	agattgattc	catactccgt	tttcaaggag	aatccctgca	gtctccttaa	240
aggtagaaca	aatactttct	attttttttt	caccattgtg	ggattggact	tttaagaggtg	300
actctaaaaa	aacagagaac	aaatatgtct	cagttgtatt	aagcacggac	ccatattatc	360
atattcactt	aaaaaaatga	tttctgtgtc	accttttggc	aacttctctt	ttcaatgtag	420
ggaaaaactt	agtcacccctg	aaaaccacaca	aaataaataa	aaattgtaga	tgtgggcaga	480
argtttgggg	gtggacattg	tatgtgttta	aattaaaccc	tgtatcactg	agaagctgtt	540
gtatgggtca	gagaaaatga	atgcttagaa	gctgttcaca	tcttcaagag	cagaagcaaa	600
ccacatgtct	cagctatatt	attatttatt	ttttatgpat	aaagtgaatc	atttcttctg	660
tattaatttc	caaaggggtt	taccctctat	ttaaatgctt	tgaaaaacag	tgcattgaca	720
atgggttgat	atttttcttt	aaaagaaaaa	tataattatg	aaagccaaga	taatctgaag	780
cctgttttat	tttaaaactt	tttatgttct	gtggttgatg	ttgtttgttt	gtttgtttct	840
attttgttgg	ttttttactt	tgttttttgt	tttgttttgt	tttggtttdg	catactacat	900
gcagtttctt	taaccaatgt	ctgtttggct	aatgtaatta	aagttgttaa	tttatatgag	960
tgcatttcaa	ctatgtcaat	ggtttcttaa	tatttattgt	gtagaagtac	tggtaatttt	1020
tttatttaca	atatgtttta	agagataaca	gtttgatatg	ttttcatgtg	tttatagcag	1080
aagttattta	tttctatggc	attccagcgg	atattttggt	gtttgcgagg	catgcagtca	1140
atattttgta	cagtttagtg	acagtattca	gcaacgcctg	atagcttctt	tggccttatg	1200
ttaaataaaa	agacctgttt	gggatgtaaa	aaaaaaaaaa	aaaaaaaaaa	aaaaaaaaaa	1260
aaaaa						1265

<210> 170

<211> 383

<212> DNA

<213> Homo sapien

<400> 170

tgtaagtcga	gcagtgatg	gacgatattc	ttcttattaa	tgttgtaatt	gaacaaatga	60
tctgtgatac	tgatcctgag	ctaggaggcg	ctgttcagtt	aatgggactt	cttcgtactc	120
taattgatcc	agagaaatg	ctggctacaa	ctaataaac	cgaaaaaagt	gaattttctaa	180
attttttcta	caaccattgt	atgcattgtt	tcacagcacc	acttttgacc	aatacttcag	240
aagacaaatg	tgaaaaggat	aatatagttg	gatcaaacaa	aaacaacaca	atttgtcccg	300
ataattatca	aacagcacag	ctacttgctt	taattttaga	gttactcaca	ttttgtgtgg	360
aacatcacac	tgctcgactt	aca				383

<210> 171

<211> 383

<212> DNA

<213> Homo sapien

<400> 171

tgggcacctt	caatatcgca	agttaaaaat	aatgttgagt	ttattatact	tttgacctgt	60
ttagctcaac	agggtgaagg	catgtaaaga	atgtggactt	ctgaggaatt	ttcttttaaa	120
aagaacataa	tgaagtaaca	ttttaattac	tcaaggacta	cttttggttg	aagtttataa	180
tctagatacc	tctacttttt	gtttttgtgt	ttcgacagtt	cacaaagacc	ttcagcaatt	240
tacagggtaa	aatcgttgaa	gtagtggagg	tgaaactgaa	attttaaaatt	attctgtaaa	300
tactataggg	aaagaggctg	agcttagaat	cttttggttg	ttcatgtgtt	ctgtgctctt	360
atcatcacac	tgctcgactt	aca				383

<210> 172
 <211> 699
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)... (699)
 <223> n = A,T,C or G

<400> 172

```
tcgggtgatg cctcctcagg cttgtcggtta gtgtacacag agctgctcat gaagcgacag      60
cggctgcccc tggcacttca gaacctcttc ctctacactt ttggtgcgct tctgaatcta      120
ggtctgcatg ctggcgggcgg ctctggccca ggccctcctgg aaagtctctc aggatgggca      180
gcactcgtgg tgctgagcca ggcactaaat ggactgctca tgtctgctgt catggagcat      240
ggcagcagca tcacacgcct ctttgtggtg tcctgctcgc ttgtggtcaa cgcctgctc      300
tcagcagtc tgcctacggct gcagctcaca gccgccttct tcctggccac attgctcatt      360
ggcctggcca tgcgcctgta ctatggcagc cgctagctcc tgacaacttc caccctgatt      420
ccggaccctg tagattgggc gccaccacca gatccccctc ccaggccttc ctccctctcc      480
catcagcggc cctgtaacaa gtgccttgtg agaaaagctg gagaagtgag ggcagccagg      540
ttattctctg gaggttggtg gatgaagggg taccctagg agatgtgaag tgtgggtttg      600
gttaaggaaa tgcttaccat cccccaccc caaccaagtt nttccagact aaagaattaa      660
ggtaacatca atacctaggc ctgaggaggc atcacccga                                699
```

<210> 173
 <211> 701
 <212> DNA
 <213> Homo sapien

<400> 173

```
tcgggtgatg cctcctcagg ccagatcaaa cttgggggttg aaaactgtgc aaagaaatca      60
atgtcggaga aagaattttg caaaagaaaa atgectaate agtactaatt taatagggtca      120
cattagcagt ggaagaagaa atgttgatat tttatgtcag ctattttata atcaccagag      180
tgcttagctt catgtaagcc atctcgtatt cattagaaat aagaacaatt ttattcgtcg      240
gaaagaactt ttcaatttat agcatcttaa ttgctcagga ttttaaattt tgataaagaa      300
agctccactt ttggcaggag tagggggcag ggagagagga ggctccatcc acaaggacag      360
agacaccagg gccagtaggg tagctgggtg ctggatcagt cacaacggac tgacttatgc      420
catgagaaga aacaacctcc aaatctcagt tgcttaatac aacacaagct catttcttgc      480
tcacgttaca tgcctatgt agatcaacag caggtgactc agggaccacag getccatctc      540
catatgaget tccatagtca ccaggacacg ggctctgaaa gtgtcctcca tgcagggaca      600
catgcctctt cctttcattg ggcagagcaa gtacttatg gcoagaagtc eactgcagg      660
gcagtgccat cctgctgtat gcctgaggag gcacacccg a                                701
```

<210> 174
 <211> 700
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)... (700)
 <223> n = A,T,C or G

<400> 174

```
tcgggtgatg cctcctcang ccctaaatc agagtcacag gtcagagcca caggagacag      60
```


ggaaagacat	agattttaac	cggcccccct	caggagattc	tgaggctcag	ttcactttgt	120
tgcagtttga	acagaggcag	caaggctagt	ggttaggggc	acggtctcta	aagctgcact	180
gcctggatct	gcctcccagc	tctgccagga	accagctgcg	tggccttgag	ctgctgacac	240
gcagaaagcc	ccctgtggac	ccagtctcct	cgtctgtaag	atgagyacag	gactctagga	300
accctttccc	ttggtttggc	ctcactttca	caggctccca	tcttgaactc	tatctactct	360
tttctgaaa	ccttgtaaaa	gaaaaaagtg	ctagcctggg	caacatggca	aaaccctgtc	420
tctacaaaaa	atacaaaaat	tagttgggtg	tgggtggcatg	tgccctgtagt	cccagccact	480
tgggaggtgc	tgaggtggga	ggatcacttg	agcccgggag	gtggaggttg	cagtgcagcca	540
agatcatgcc	actgcactcc	agcctgagta	atagagtaag	actctgtctc	aaaaacaaca	600
acaacaacag	tgagtgtgcc	tctgtttccg	ggttggatgg	ggcaccacat	ttatgcatct	660
ctcagatttg	gacgctgcag	cctgaggagg	catcaccoga			700

<210> 175

<211> 484

<212> DNA

<213> Homo sapien

<220>

<221> misc feature

<222> (1) ... (484)

<223> n = A, T, C or G

<400> 175

tatagggcga	attggggccc	agttgcatgn	tcccggccgc	catggccgcg	ggattcgggt	60
gatgctcct	caggcttgtc	tgccacaagc	tacttctctg	agctcagaaa	gtgccccttg	120
atgagggaaa	atgtcctact	gcactgcgaa	tttctcagtt	ccattttacc	tcccagtcct	180
ccttctaaac	cagtttaataa	attcattcca	caagtattta	ctgattacct	gcttgtgcca	240
gggactattc	tcaggctgaa	gaaggctggga	ggggagggcg	gaacctgagg	agccacctga	300
gccagcttta	tatttcaacc	atggctggcc	catctgagag	catctcccca	ctctgcgcaa	360
cctatcgggg	catagcccag	ggatgcccc	aggcgcccca	ggttagatgc	gtccctttgg	420
cttgtcagty	atgacataca	ccttagctgc	ctagctggtg	ctggcctgag	gagycatcac	480
ccga						484

<210> 176

<211> 432

<212> LNA

<213> Homo sapien

<400> 176

tggggtgatg	cctcctcagg	gctcaaggga	tgaagaagtga	cttctttctg	gagggaccgt	60
tcataccacc	caggatgaaa	acggataggg	accacttgg	aggacttgct	gatatgtttg	120
gcacaaatgcc	aggtagcgga	attggtactg	gtccaggagt	tatccaggat	agattttcac	180
ccaccatggg	acgtcatcgt	tcaaataaac	tcttcaatgg	ccatgggggga	cacatcatgc	240
ctcccacaca	atcgacgttt	ggagagatgg	gaggcaagtt	tatgaaaagc	caggggctaa	300
gccagctcta	ccataaccag	agtcaggggac	tcttatccca	gctgcaagga	cagtccaagg	360
atatgccacc	tgggttttct	aagaaaggac	agcttaatgc	agatgagatt	agcctgagga	420
ggcatcaccc	ga					432

<210> 177

<211> 788

<212> DNA

<213> Homo sapien

<400> 177

tagcatgttg agcccagaca cagtagcatt tgtgcccaatt tctggttgga atggtgacaa 60

catgctggag	ccaagtgcta	acatgccttg	gttcaagga	tggaaagtca	cccgttaagga	120
tggcaatgcc	agtggaaacca	cgctgcttga	ggctctggac	tgcatectac	caccaactcg	180
cccaactgac	aagcccttgc	gcctgcctct	ccaggatgtc	tacaaaattg	gtggtattgg	240
tactgttccct	gttggccgag	tggagactgg	tggtctcaaa	cccggtatgg	tggtcacctt	300
tgctccagtc	aacgttacaa	cggaagtaaa	atctgtcgaa	atgcaccatg	aagctttgag	360
tgaagctctt	cctggggaca	atgtgggctt	caatgtcaag	aatgtgtctg	tcaaggatgt	420
tctgtgtggc	aacgttgctg	gtgacagcaa	aaatgaccca	ccaatggaag	cagctggctt	480
cactgctcag	gtgattatcc	tgaaccatcc	aggccaaata	agtgcgggt	atgcccctgt	540
attggattgc	cacacggctc	acattgcatg	caagtttgc	gagctgaagg	aaaagattga	600
tgcgcgttct	ggtaaaaagc	tggaagatgg	ccctaaattc	ttgaagtctg	gtgatgctgc	660
cattgttgat	atggttctctg	gcaagcccat	gtgtgttgag	agcttctcag	actatccacc	720
tttgggtcgc	tttgcgttct	gtgatatgag	acagacagtt	gcggtgggtg	tctgggctca	780
acatgcta						788

<210> 178

<211> 786

<212> DNA

<213> Homo sapien

<400> 178

tagcatgttg	agcccagaca	cctgtgtttc	tgggagctct	ggcagtgccg	gattcatagg	60
cacttgggct	gcactttgaa	tgacacactt	ggctttatta	gattcactag	tttttaaaaa	120
attgtttgtc	gtttcttttc	attaaagggt	taatacagaca	gatcagacag	cataattttg	180
tatttaataga	cagaaacgtt	ggtacatttc	ttcatgaatg	agcttgcatt	ctgaagcaag	240
agcctacaaa	aggcacttgt	tataaatgaa	agttctggct	ctagaggcca	gtactctgga	300
gtttcagagc	agccagtgat	tggtccagtc	agtgatgoot	agttatatag	aggaggagta	360
cactgtgcac	tcttctaggt	gtaagggtat	gcaactttgg	atcttaaaat	tctgtacaca	420
tacacacttt	atatatatgt	atgtatgtat	gaaaacatga	aattagtttg	tcaaatatgt	480
gtgtgttttag	tatttttagct	tagtgcaact	atttccacat	tatttattaa	attgatctaa	540
gacactttct	tggtgacacc	ttgaatatga	atgttcaagg	gtgcaatgtg	tattccttta	600
gattgttaaa	gcttaattac	tatgatttgt	agtaaattaa	cttttaaaat	gtatttgagc	660
ccttctgtag	tgctgtaggg	ctcttacagg	gtgggaaaga	ttttaatttt	ccagttgcta	720
attgaacagt	atggcctcat	tatatatttt	gatttatagg	agtttgtgtc	tgggctcaac	780
atgcta						786

<210> 179

<211> 796

<212> DNA

<213> Homo sapien

<400> 179

tagcatgttg	agcccagaca	ctgggttaca	gaccagacct	gcttctcca	tatgtaaaca	60
gcttttaaaa	agccagtga	cctttttaat	actttggcaa	ccttctttca	caggcaaaga	120
acacccccat	ccgcccttg	tttgagtg	agagtttggc	tttggttctt	tgccttgect	180
ggagtatact	tctaattcct	gttgtcctgc	acaagctgaa	tacagagcta	cccaccgcca	240
cccaggccag	gtttccactc	atttattact	ttatgtttct	gttccattgc	tggtccacag	300
aaataagttt	tcctttggag	gaatgtgatt	ataccctttt	aatttcctcc	ttttgctttt	360
ttttaatatc	attggtatgt	gtttggccca	gaggaaactg	aaattcacca	tcattcttgac	420
tggcaatccc	attaccatgc	tttttttaaa	aaacgtaatt	tttcttgctt	tacattggca	480
gagtagccct	tcctggctac	tggttaaatg	tagtcaactca	gtttctaggt	ggcattaggc	540
atgagacctg	aagcacagac	tgtcttacca	caaaagggtga	caagatctca	aaccttagcc	600
aaagggtat	gtcaggtttc	aatgctatct	gcttctgttc	ctgctcactg	ttctggattt	660
tgctcttctt	cateccatgc	accagaattt	cccagttctc	ctccctacct	tccttgtttt	720
taattctaat	ctatcagcaa	aataactttt	caaatgtttt	aaccgggtatc	tccatgtgtc	780
tgggctcaac	atgcta					796

<210> 180
 <211> 488
 <212> DNA
 <213> Homo sapien

<400> 180

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ggatgtgctg caaggcgatt aagttgggtg acgccagggt tttcccagtc acgacgttgt      60
aaaacgacgg ccagtgaatt gtaatacggc tcactatagg gogaattggg cccgacgtcg      120
catgctcccg gccgccatgg ccgcggggata gcatgttgag cccagacacc tgcagggtcat      180
ttggagagat ttttcacgtt accagcttga tgggtctttt caggaggaga gacactgagc      240
actcccaagg tgaggttgaa gatttcctct agatagccgg ataagaagac taggagggat      300
gcctagaaaa tgattagcat gcaaatttct acctgccatt tcagaactgt gtgtcagccc      360
acattcagct gtttcttggt aactgaaaag agagagggtat tgagactttt ctgatggccg      420
ctctaacatt gtaacacagt aatctgtgtg tgtgtgggtg tgtgtgtgtg tctgggctca      480
acatgcta                                     488
  
```

<210> 181
 <211> 317
 <212> DNA
 <213> Homo sapien

<400> 181

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tagcatgttg agcccagaca cggcgacggt acctgatgag tggggtgatg gcacctgtga      60
aaaggaggaa cgtcatcccc catgatattg gggacccaga tgatgaacca tggtccgcg      120
tcaatgcata tttaatccat gatactgctg atttgaagga cctgaacctg aagtttgtgc      180
tgcagggttta tcgggactat tacctcacgg gtgatcaaaa ctctctgaag gacatgtggc      240
ctgtgtgtct agtaagggat gcacatgcag tggccagtgt gccaggggta tggttgggtg      300
ctgggctcaa catgcta                                     317
  
```

<210> 182
 <211> 507
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)... (507)
 <223> n = A,T,C or G

<400> 182

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tagcatgttg agcccagaca ctggctgtta gccaaatcct ctctcagctg ctccctgtgg      60
tttgggtgact caggattaca gaggcactct gtttcaggga acaaaaagat tttagctgcc      120
agcagagagc accacatata ttagaatggt aaggactgcc acctccttca agaacaggag      180
tgaggttggt ggtgaatggg aatggaagcc tgcattcctt gatgcatttg tgctctctca      240
aatcctgtct tagtcttagg aaaggaagta aagtttcaag gacggttccg aactgctttt      300
tgtgtctggg ctcaacatgc tatcccgagg ccattggcggc cgggagcatg cgacgtcggg      360
cccaattcgc cctatagtga gtcgtattac aattcactgg ccgtcgtttt acaacgtcgt      420
gactgggaaa acctggcgtt tacccaactt aatgccttg cagcacatcc ccctttccca      480
gctggcgtaa tanegaaaag gcccgca                                     507
  
```

<210> 183
 <211> 227
 <212> DNA
 <213> Homo sapien

<400> 183

gatttacgct	gcaacactgt	ggaggtagcc	ctggagcaag	gcaggcatgg	atgcttctgc	60
aatcccaaaa	tggagcctgg	tatttcagcc	aggaatctga	gcagagcccc	ctctaattgt	120
agcaatgata	agttattctc	tttgttcttc	aaccttccaa	tagccttgag	cttccagggg	180
agtgtcgta	atcattacag	cctgggtctcc	acagtgttgc	agcgtaa		227

<210> 184

<211> 225

<212> DNA

<213> Homo sapien

<400> 184

ttacgctgca	acactgtgga	gcagattaac	atcagacttt	tctatcaaca	tgactggggg	60
tactaaaaag	acaacaaatc	aatggcttca	aaagtctaag	gaataatttc	gatacttcaa	120
ctttataaaa	cctgacaaaa	ctatcaatca	agcataaaga	cagatgaaga	acatttccag	180
atthttggcca	atcagatatt	ttacctccac	agtgttgcag	cgtaa		225

<210> 185

<211> 597

<212> DNA

<213> Homo sapien

<400> 185

ggcccgaagt	tgcatgttcc	cgcccgccat	ggccgcggga	ttcgtaggg	tctctatcca	60
ctgggaccca	taggctagtc	agagtattta	gagttgagtt	cctttctgct	tcccagaatt	120
tgaaagaaaa	ggagttaggt	gatagagctg	agagatcaga	tttgctctg	aagcctgttc	180
aagatgtatg	tgctcagacc	ccaccactgg	ggcctgtggg	tgaggctctg	ggcatctatt	240
tgaatgaatt	gctgaagggg	agcactatgc	caaggaaggg	gaacccatcc	tggcactggc	300
acaggggtca	ccttatccag	tgctcagtcg	ttctttgctg	ctacctggtt	ttctctcata	360
tgtgaggggc	aggtaagaag	aagtgccrcg	tgttgtgcga	gttttagaac	atctaccagt	420
aagtggggaa	gtttcacaaa	gcagcagott	tgttttgtgt	atthttcacct	tcagttagaa	480
gaggaaggct	gtgagatgaa	tgtagtttga	gtggaaaaga	cgggtaagct	tagtggatag	540
agaccctaac	gaatcactag	tgcggccgcg	ttgcaggtcg	accatattgg	agagctc	597

<210> 186

<211> 597

<212> DNA

<213> Homo sapien

<400> 186

ggcccgaagt	tgcatgttcc	cgcccgccat	ggccgcggga	ttcgtaggg	tctctatcca	60
ctacctaaaa	aatcccaaac	atataactga	actcctcaca	cccaattgga	ccaatccatc	120
accccagagg	cctacagatc	ctcctttgat	acataagaaa	atttcccaa	actacctaac	180
tatatcattt	tgcaagattt	gttttaccaa	atthttgatg	cctttctgag	cttgtcagtg	240
tgaaccacta	ttacgaacga	tcggatatta	actgcccctc	accgtccagg	tgtagctggc	300
aacatcaagt	gcagtaaata	ttcattaagt	tttcacctac	taagggtgctt	aaacacccta	360
gggtgccatg	tcggtagcag	atcttttgat	ttgtttttat	ttcccataag	ggteetgttc	420
aagggtcaatc	atacatgtag	tgtgagcagc	tagtcactat	cgcagtactt	ggaggggtgat	480
aatagaggcc	tcctttgctg	ttaaagaact	cttgtcccag	cctgtcaaag	tggatagaga	540
ccctaacgaa	tcactagtgc	ggccgcctgc	aggtcgacca	tatgggagag	ctcccaa	597

<210> 187

<211> 324

<212> DNA

<213> Homo sapien

<400> 187

tcgttagggg	ctctatccac	ttgcaggtaa	aatccaatcc	tgtgtatata	ttatagtott	60
ccatatgtag	tgggtcaaga	gactgcagtt	ccagaaagac	tagccgagcc	catccatgtc	120
ttccacttaa	ccctgctttg	ggttacacat	cttaactttt	ctgttcaagt	ttctctgtgt	180
agtttatagc	atgagtattg	ggawaatgcc	ctgaaacctg	acatgagatc	tgggaaacac	240
aaacttactc	aataagaatt	tctcccatat	ttttatgatg	gaaaaatttc	acatgcacag	300
aggagtggat	agagacccta	acga				324

<210> 188

<211> 178

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1) ... (178)

<223> n = A,T,C or G

<400> 188

gcgcggggg	atcggtgat	acctcctcat	gccaaaatac	aacgtntaat	ttcacaactt	60
gccttccaat	ttacgcattt	tcaatttgct	ctccccattt	gttgagtcac	aacaaacacc	120
attgccaga	aacatgtatt	acctaacatg	cacatactct	taaaactact	catccctt	178

<210> 189

<211> 367

<212> DNA

<213> Homo sapien

<400> 189

tgacaccttg	tcagcatct	gacacagtct	tggctcttgg	aaaatattgg	ataaatgaaa	60
atgaatttct	ttagcaagt	gtataagctg	agaatatacg	tatcacatat	cctcattcta	120
agacacattc	agtgtccttg	aaattagaat	aggacttaca	ataagtgtgt	tcactttctc	180
aatagctgtt	attcaattga	tggtaggcct	taaaagtcaa	agaaatgaga	gggcatgtga	240
aaaaaagctc	aacatcactg	atcattagaa	aacttccatt	caaaccccca	atgagatacc	300
atctcatacc	agtcagaatg	gctattatta	aaaagtcaaa	aaataacaga	tgctggacaa	360
ggtgtca						367

<210> 190

<211> 369

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1) ... (369)

<223> n = A,T,C or G

<400> 190

gacaccttgt	ccagcatctg	acaacgctaa	cagcctgagg	agatctttat	ttattttattt	60
agtttttact	ctggctaggc	agatgggtggc	taaaacattc	atttaccat	ttattcattt	120
aattgttctc	gcaaggccta	tggatagagt	attgtccagc	actgctctgg	aagctaggag	180
catgggggat	aacaagatag	gctacatcct	gttccacag	aacttccact	ttagtctggg	240
aaacagatga	tatatacaaa	tatataaatg	aattcaggta	gttttaagta	cgaaaagaat	300

aagaaagcag agtcatgatt tanaatgctg gaaacagggg ctattgcttg agatattgaa 360
 ggtgcccaa 369

<210> 191
 <211> 369
 <212> DNA
 <213> Homo sapien

<400> 191
 tgacaccttg tccagcatct gcacagggaa aagaaactat tatcagagtg aacagggaac 60
 ctacagaatg ggagaaaatt tttgcaatct atccatctga caaagggcta atatccagaa 120
 tctacaaaga acttatacaa atttacaaga aacaaacaaa caaacaactc ctcaaaaagt 180
 ggggtgaagga tgtgaacaga caattctcaa aagaagacat ttatgggggc aacaaacata 240
 tgaaaaaaag ctcatcatca ctggctacta gataaatgca aatcaaaacc acaatgagat 300
 accatctcat tccagttaga atggcaatca ttaaaaagtc aggaacaac agatgctgga 360
 caaggtgtc 369

<210> 192
 <211> 449
 <212> DNA
 <213> Homo sapien

<400> 192
 tgacgcttgg ccacttgaca dttcatcttt gcacagaaaa acttctttac agatttaatt 60
 caagactggc ctagtgcag tctccagac attttttcat ttgttcata tacgtggaat 120
 tttaaaatca tgtttcatca gtttgaaatg atttgggctg ctaatcaaca caattggatc 180
 gactgttcta ctaacaaca ggaaaatgtg tatctggcag cctgtggaga aacactaaac 240
 attgattttt ctttgctttt tacggacttt gttccagcta catgtaatac caagttctct 300
 ttaagaggag aagatgttga tcttcatttg tttctaccag actgccacc tagtaaatat 360
 tctttattta tgctggtaaa aaattgccat ccaaataaga tgattcatga tactggtatt 420
 cctgctgagt gtcaagtggc caagcgtca 449

<210> 193
 <211> 372
 <212> DNA
 <213> Homo sapien

<400> 193
 tgacgcttgg ccacttgaca ccagggatgt akcagttgaa tataatcctg caattgtaca 60
 tattggcaat tttccatcaa acattctaga aagagacaac caggattgct aggccataaa 120
 agctgcaata aataactggc aattgcagta atcatttcag gccaatcaaa tccagtttgg 180
 ctacagagtg cttttggctg agagaagagg tgagatataa tgtgttttct tgcaacttct 240
 tggaagaata actccacaat agtctgagga ctagatacaa acctatttgc cattaaagca 300
 ccagagtctg ttaattccag tactgataag tgttggagat tagactccag tgtgtcaagt 360
 ggccaagcgt ca 372

<210> 194
 <211> 309
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)... (309)
 <223> n = A,T,C or G

tgacgcttg	ccacttgaca	cttatgtaga	atccatcg	ggctgatgca	agccctttat	60
ttaggcttag	tgttgtgggc	accttcaata	tcacactaga	gacaaacgcc	acaagatctg	120
cagaaacatt	cagttctgan	cactcgaatg	gcaggataac	tttttgtgtt	gtaatccttc	180
acataataaa	aaacaaactc	tgcantctca	cgttacaaaa	aaacgtactg	ctgtaaaaata	240
ttaagaaggg	gtaaaggata	ccatctataa	caaagtaact	tacaactagt	gtcaagtggc	300
caagcggtca						309

<213> Homo sapien

<223> n = A, T, C or G

tgacgcttg	ccacttgaca	cccaatctcg	cacttcaccc	tcccagcacc	tgatgaagta	60
ggactgcaac	tatcccact	tcccagatga	ggggaccaan	gtacacatta	ggacccggat	120
gggagcacag	atttgtcga	tcccagactc	caagcactca	gcgtcactcc	aggacagcgg	180
ctttcagata	aggtcacaaa	catgaatggc	tccgacaacc	ggagtcagtc	cgtgctgagt	240
taaggcaatg	gtgacacgga	tgacgctgt	acctgtaatg	gttcacgta	agtgtcaagt	300
ggccaagcgt	ca					312

<213> Homo sapien

tgtatgcagc	tagtgggtctc	ctcagccatg	cagaactgtg	actcaattaa	acctctttcc	60
tttatgaatt	acccaatctc	gggtagtgtc	tttatagtag	tgtgagaatg	gactaataca	120
agtacatttt	acttagtaat	aataataaac	aaatatatta	cattttttgtg	tattttactac	180
accatatttt	ttattgttat	tgtagtgtac	accttctact	tattaaaaga	aataggcccg	240
agcgcggcag	atcacgaggt	caggagatgg	agaccactac	gtcgatac		288

<213> Homo sapien

ttgggcacct	tcaatatcat	gacagggtgat	gtgataacca	agaaggctac	taagtgatta	60
atgggtgggt	aatgtataca	gagtaggtac	actggacaga	ggggtaatc	atagccaagg	120
caggagaagc	agaatggcaa	aacatttcac	cacactactc	aggatagcat	gcagtttaa	180
acctataagt	agtttatttt	tgggaatttc	cacttaatat	tttcagactg	caggtaacta	240
aactgtgga	cacaagaaca	tagataaggg	gagaccacta	cgtcgatac		289

<213> Homo sapien

<400> 198

gtatcgacgt	agtgggtctcc	caagcagtg	gaagaaaacg	tgaaccaatt	aaaatgtatc	60
agatacccca	aagaaaggcg	cttgagtaaa	gattccaagt	gggtcacaat	ctcagatctt	120
aaaattcagg	ctgtcaaaga	gatttgctat	gaggttgctc	tcaatgactt	caggcacagt	180
cggcaggaga	ttgaagccct	ggccattgtc	aagatgaagg	agctttgtgc	catgtatggc	240
aagaaagacc	ccaatgagcg	ggactcctgg	agaccactac	gtcgatac		288

<210> 199

<211> 1027

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(1027)

<223> n = A,T,C or G

<400> 199

gcttttttggg	aaaaacncaa	ntgggggaaa	gggggnttnn	tngcaagggg	ataaaggggg	60
aancccgagg	tttccccatt	cagggaggtg	caaaaagncg	gccaggggat	tgtaanagga	120
ttcaataata	gggggaatgg	gcccnagaag	tgcaagggtc	cngcccggca	tgncgcgygg	180
atttagtgac	attacgacgs	tggtataaaa	gtgggsccaa	waaatatattg	tgatgtgatt	240
tttagaccag	tgaaccatt	gwacaggacc	tcatttccty	tgagatgrta	gccataatca	300
gataaaagrt	tagaagtytt	tctgcacgtt	aacagcatca	ttaaatggag	tggtatcacc	360
aatttcaccc	tttgtagcc	gataccttcc	ccttgaaggc	attcaattaa	gtgaccaatc	420
gtcatacgag	aggggatggc	atggggattg	atgatgatat	caggggtgat	accttcacag	480
gtgaaaggca	tatectcttg	tctatactga	ataccacaag	tacccttttg	accatgtcga	540
ctagcaaatt	tgtctccaat	ctgtgtwate	cctaacagag	cgtaccctta	ttttacaaa	600
tttatatcct	tctgtattga	gagttaccat	aacctgatcc	acaatgcccg	tctcgctwgt	660
tctgagaaaa	gtgtacaggt	ctctcttggt	atagcgtcta	ttggtgctct	ccaattcctc	720
ttcatttttc	aggcaagggtg	aactgttttg	cctataataa	cmtcatctcc	tgatacmcga	780
aacccckgga	retatcaaac	catcatcatc	cagcgttckt	watgtymcta	aatccctatt	840
ggggccgcct	gcaggtcaac	atatnggaaa	acccccacc	ccttnggagc	ntaccttgaa	900
ttttccatat	gtccentaaa	ttancctngc	ttancctggc	cntaacctnt	tccgggttaa	960
attgtttccg	ccccenttcc	ccnccttnna	accggaaacc	ttaattttna	accngggggt	1020
cctatcc						1027

<210> 200

<211> 207

<212> DNA

<213> Homo sapien

<400> 200

agtgaacatta	cgacgctggc	catcttgaat	cctagggcat	gaagttgccc	caaagttcag	60
cacttggtta	agcctgatcc	ctctggttta	tcacaaagaa	taggatggga	taaagaaagt	120
ggacacttaa	ataagctata	aatttatatg	tccttgtcta	gcaggagaca	actgcacagg	180
tataactacca	gcgtcgtaat	gtcacta				207

<210> 201

<211> 209

<212> DNA

<213> Homo sapien

<400> 201

tgggcacctt	caatatctat	taaaagcaca	aatactgaag	aacacaccaa	gactatcaat	60
gaggttacat	ctggagtcct	cgatatatca	ggaaaaaatg	aagtgaacat	tcacagagtt	120
ttacttcctt	gggaactcaa	atgctagaaa	agaaaagggt	gcctcttttc	tctygcttcc	180
tggtcctatc	cagcgtcgta	atgtcacta				209

<210> 202

<211> 349

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1) ... (349)

<223> n = A,T,C or G

<400> 202

ntacgctgca	acactgtgga	gccactgggt	tttattcccg	gcaggttatc	cagcaaacag	60
tcactgaaca	caccgaagac	cgtgggtatg	taaccgttca	cagtaatcgt	tcagtcgtc	120
tgcgggaccc	cgacgagcgt	cactgggtac	agaccagatt	cagccggaag	agaaagcgcc	180
gcaggagag	actcgaactc	cactccgctg	gtgagcagcc	ccatgttttc	aactogaagt	240
tcaaacggca	ttgggttata	taccatcagc	tgaacttcac	acacatctcc	ttgaaccac	300
tggaaatcta	ttttcttggt	ccgctcttct	ccacagtgtt	gcagcgtaa		349

<210> 203

<211> 241

<212> DNA

<213> Homo sapien

<400> 203

tgctcctctt	gccttaccaa	cccaaagccc	actgtgaaat	atgaagtga	tgacaaaatt	60
cagttttcaa	cgcaatatag	tatagtttat	ctgattcttt	tgatctecag	gacactttaa	120
acaactgcta	ccaccaccac	caacctaggg	atttaggatt	ctccacagac	cagaaattat	180
ttctcctttg	agtttcaggc	tcctctggga	ctcctgttca	tcaatgggtg	gtaaatggct	240
a						241

<210> 204

<211> 248

<212> DNA

<213> Homo sapien

<400> 204

tagccattta	ccaccatct	gcaaaccswg	acmwwcargr	cywgwackya	ggcgatttga	60
agtactggta	atgctctgat	catgttagtt	acataagtgt	ggtcagttta	caaaaattca	120
cagaactaaa	tactcaatgc	tatgtgttca	tgtctgtgtt	tatgtgtgtg	taatgtttca	180
attaagtttt	tttaaaaaaa	agagatgatt	tccaaataag	aaagccgtgt	tggttaaggca	240
agaggagc						248

<210> 205

<211> 505

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1) ... (505)

<223> n = A,T,C or G

<400> 205

tacgctgcaa	cactgtggag	ccattcatac	aggcccttaa	ttaaggaaca	agtgattatg	60
ctacctttgc	acggttaggg	taccgcggcc	gttaaacatg	tgtcactggg	caggcggtgc	120
ctctaatact	ggtgatgcta	gaggatgatg	ttttggtaaa	caggcggggt	aagatttgcc	180
gagttccctt	tacttttttt	aacctttcct	tatgagcatg	cctgtgttgg	gttgacagtg	240
ggggtaataa	tgacttggtg	gttgattgta	gatattgggc	tgtaattgt	cagttcagt	300
ttttaatctg	acgcaggctt	atgcggagga	gaatgttttc	atgttactta	tactaacatt	360
agttcttcta	tagggtgata	gattgggtcca	attgggtgtg	aggagttcag	ttatatgttt	420
gggatttttt	aggtagtggg	tgttgancct	gaacgctttc	ttaattgggtg	gctgctttta	480
rgcctactat	gggtggtaaa	tggct				505

<210> 206

<211> 179

<212> DNA

<213> Homo sapien

<400> 206

tagactgact	catgtccctt	accaaagccc	atgtaaggag	ctgagttctt	aaagactgaa	60
gacagactat	tctctggaga	aaaataaaat	ggaaattgta	ctttaaaaaa	aaaaaaaaatc	120
ggccgggcat	ggtagcacac	acctgtaatc	ccagctacta	ggggacatga	gtcagtccta	179

<210> 207

<211> 176

<212> DNA

<213> Homo sapien

<400> 207

agactgactc	atgtccccta	ccccaccttc	tgctgtgctg	ccgtgttctt	aacagggtcac	60
agactggtac	tggtcagtgg	cctgggggtt	ggggacctct	attatatggg	atacaaat	120
aggagttgga	attgacacga	tttagtgact	gatgggatat	gggtggtaaa	tggcta	176

<210> 208

<211> 196

<212> DNA

<213> Homo sapien

<400> 208

agactgactc	atgtccccta	tttaacaggg	tctctagtgc	tgtgaaaaaa	aaaaatgctg	60
aacattgcat	ataacttata	ttgtaagaaa	tactgtaaaa	tgactttatt	gcactctgggt	120
agctgtaagg	catgaaggat	gccaagaagt	ttaaggaata	tgggtggtaa	atggctaggg	180
gacatgagtc	agtcta					196

<210> 209

<211> 345

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(345)

<223> n = A,T,C or G

<400> 209

gacgcttggc cacttgacac cttttatattt ttaaggattc ttaagtcatt tangtnactt	60
tgtaagtttt tctgtgccc ccataagaat gatagcttta aaaattatgc tggggtagca	120
aagaagatac ttctagcttt agaattgtga ggtatagcca ggattcttgt gaggaggggt	180
gatttagagc aaattttctta ttctccttgc ctcattctga acatggggat aataatagaa	240
ctggcttgac aagggttgaa ttagtattac atggtaaata catgtaaaat gtttagaatg	300
gtgccaagta tctaggaagt acttgggcat ggggtgtaaa tggct	345

<210> 210

<211> 178

<212> DNA

<213> Homo sapien

<400> 210

gacgcttggc cacttgacac tagagtaggg tttggccaac tttttctata aaggaccaga	60
gagtaaatat ttcaggcttt gtgggttgtg cagtctctct tgcaactact cagctctgcc	120
attgtagcat agaaatcagc catagacagg acagaaatga atgggtggta aatggcta	178

<210> 211

<211> 454

<212> DNA

<213> Homo sapien

<400> 211

tgggcacett caatatctat ccagcgcac taaattoget tttttcttga ttaaaaattt	60
caccacttgc tgtttttgct catgtatacc aagtagcagt ggtgtgaggg catgcttgtt	120
ttttgatctg atatcagcac cgtataagag cagtgtcttg gccattaatt tatcttcatt	180
gtagacagca tagttagag tgggtatctcc atactcatct ggaatatttg gatcagtgcc	240
atgttccagc aacattaacg cacattcatc ttcttggcat tgtacggcct ttgtcagagc	300
tgtcctcttt ttgttgtaaa ggacattaag ttgacatcgt ctgtccagca cgagttttac	360
tactttctgaa ttccattgg cagagggccag atgtagagca gtctctcttt gcttgtccct	420
cttgttcaca tcagtgtccc tgagcataac ggaa	454

<210> 212

<211> 337

<212> DNA

<213> Homo sapien

<400> 212

tccgttatgc caccagaaa acctactgga gttacttatt aacatcaagg ctggaacctt	60
tttgccctcag tcttatctga ttcattgagca catgggttatt actgatcgca ttgaaaacat	120
tgatcaacctg ggtttcttta tttatcgact gtgtcatgac aaggaaactt acaaactgca	180
acgcagagaa actattaaa gttattcagaa acgtgaagcc agcaattgtt tcgcaattcg	240
gcattttgaa aacaaatttg ccgtggaaac ttttaatttgt tcttgaacag tcaagaaaaa	300
cattattgag gaaaattaat atcacagcat aacggaa	337

<210> 213

<211> 715

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1) ... (715)

<223> n = A,T,C or G

<400> 213

tcgggtgatg	cctcctcagg	catcttccat	ccatctcttc	aagattagct	gtcccaaagt	60
tttttccttc	tcttctttac	tgataaattt	ggactccttc	ttgacactga	tgacagcttt	120
agtatccttc	ttgtcacctt	gcagacttta	aacataaaaa	tactcattgg	ttttaaagg	180
aaaaaagtat	acattagcac	tattaagctt	ggccttgaaa	cattttctat	cttttattaa	240
atgtcggtta	gctgaacaga	attcatttta	caatgcagag	tgagaaaaga	aggagctat	300
atgcatttga	gaatgcaagc	attgtcaa	aaacatttta	aatgctttct	taaagtgagc	360
acatacagaa	atacattaag	atattagaaa	gtgtttttgc	ttgtgtacta	ctaattaggg	420
aagcaccttg	tatagttcct	cttctaaaa	tgaagtagat	tttaaaaacc	catgtaattt	480
aattgagctc	tcagttcaga	ttttaggaga	attttaacag	ggatttggtt	ttgtctaaat	540
tttgtcaatt	tnnttagtta	atctgtataa	ttttataaat	gtcaaacgtg	atttagtccg	600
ttttcatgct	gctatgaaag	aaatacccan	gacagggtta	tttataaang	gaaagangtt	660
aatttgactc	ccagttcaca	ggcctgagga	ngnatchccc	gaaatcctta	ttgcg	715

<210> 214

<211> 345

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(345)

<223> n = A,T,C or G

<400> 214

ggtaangngc	atacntcggg	gctccggccg	cggagtcggg	gggattcggg	tgatgcctcc	60
tcaggccac	ttgggcctgc	ttttcccaa	tggcagctcc	tctggacatg	ccattccttc	120
tcccacctgc	ctgattcttc	atatgttggg	tgtccctggt	tttctgggtg	tatttcttga	180
ctgctgttca	gctgccactg	tctgcaaag	cctgcctttt	taaatacctc	accattcctt	240
catttgtttc	ttaaatatgg	gaagtgaag	tgccacctga	ggccgggcac	agtggctcac	300
gcctgtaate	ccagcacttt	gggagcctga	ggaggcatca	cccga		345

<210> 215

<211> 429

<212> DNA

<213> Homo sapien

<400> 215

ggtgatgcct	cctcaggcga	agctcaggga	ggacagaaac	ctcccgtgga	gcagaagggc	60
aaaagctcgc	ttgatcttga	ttttcagtag	gaatacagac	cgtgaaagcg	gggcctcacg	120
atccttctga	ccttttgggt	tttaagcagg	aggtgtcaga	aaagttacca	cagggataac	180
tggcttgtgg	cggccaagcg	ttcatagcga	cgctgccttt	tgatccttcg	atgtcggctc	240
ttcctatcat	tgtgaagcag	aattcaccaa	gcgttggatt	gttcaccac	taatagggaa	300
cgtgagctgg	gtttagaccg	tcgtgagaca	ggttagtttt	accctactga	tgatgtgtkg	360
ttgccatggg	aatcctgctc	agtacgagag	gaaccgcagg	ttcasacatt	tggtgtatgt	420
gcttgctctt						429

<210> 216

<211> 593

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(593)

<223> n = A,T,C or G

<400> 216

tgacacctat	gtcngcatc	tgttcacagt	tccacaaat	agccagcctt	tgccacctc	60
tctgtcctga	ggtatacaag	tatatcagga	ggtgtatacc	ttctcttctc	ttccccacca	120
aagagaacat	gcaggtctcg	gaagctgtct	taggagcctt	tggtctcaga	atttcagagt	180
cttggttacc	ttggatgtgg	tctggaagga	gaaacattgg	ctctggataa	ggagtacagc	240
cggaggaggg	tcacagagcc	ctcagctcaa	gcccctgtgc	cttagtctaa	aagcagcttt	300
ggatgaggaa	gcaggttaag	taacatacgt	aagcgtacac	aggtagaaag	tgctgggagt	360
cagaattgca	cagtgtgtag	gagtagtacc	tcaatcaatg	agggcaaata	aactgaaaga	420
agaagaccna	ttaatgaatt	gcttanggga	aaggatcaag	gctatcatgg	agatctttct	480
aggaagatta	ttgtttanaa	ttatgaaagg	antagggcag	ggacagggcc	agaagtanaa	540
ganaacattg	cctatanccc	ttgtcttgca	cccagatgct	ggacaagggtg	tca	593

<210> 217

<211> 335

<212> DNA

<213> Homo sapien

<400> 217

tgacaccttg	tccagcatct	gacgtgaaga	tgagcagctc	agaggagggtg	tcctggattt	60
cctggttctg	tggtctccgt	ggcaatgaat	tcttctgtga	agtggatgaa	gactacatcc	120
aggacaaatt	taatcttact	ggactcaatg	agcaggtccc	tcactatcga	caagctctag	180
acatgatctt	ggacctggag	cctgatgaag	aactggaaga	caaccccaac	cagagtgacc	240
tgattgagca	ggcagccgag	atgctttatg	gattgatcca	cgcccgctac	atccttacca	300
accgtggcat	cgccagatg	ctggacaagg	tgtca			335

<210> 218

<211> 248

<212> DNA

<213> Homo sapien

<400> 218

tacgtactgg	tcttgaaggt	cttaggtaga	gaaaaaatgt	gaatatttaa	tcaaagacta	60
tgtatgaaat	gggactgtaa	gtacagaggg	aaggggtggc	cttatcgcca	gaagttggta	120
gatgcgtccc	cgtcatgaaa	tgttgtgtca	ctgcccagaca	tttgccgaat	tactgaaatt	180
ccgtagaatt	agtgcaaat	ctaacgttgt	tcactaaga	ttatggttcc	atgtttctag	240
tactttta						248

<210> 219

<211> 530

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1) ... (530)

<223> n = A,T,C or G

<400> 219

tgacgcttgg	ccacttgaca	caagtagggg	ataaggacaa	agacccatna	ggtggcctgt	60
cagccttttg	ttactgttgc	ttccctgtca	ccacggcccc	ctctgtaggg	gtgtgctgtg	120
ctctgtggac	attggtgcat	tttcacacat	accattctct	ttctgcttca	cagcagtcct	180
gaggcgggag	cacacaggac	taccttgtca	gatgangata	atgatgtctg	gccaaactcac	240
cccccaacct	tctcactagt	tatangaaga	gccangccta	naaccttcta	tcctgncccc	300

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ttgccctatg acctcatccc tgttccatgc cctattctga tttctggtga actttggagc 360
agcctgggtt ntectectca ctccagcctc tctccatacc atgggtanggg ggtgctgttc 420
cacncaaang gtcagggtgtg tctgggggaat cctnñanct gccnggagtt tccnangcat 480
tcttaaaaac cttcttgctt aatcanatng tgtccagtgg ccaacntcn 530

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<210> 220

<211> 531

<212> DNA

<213> Homo sapien

<400> 220

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tgacgcttgg ccacttgaca ctaaatagca ttttctaaag gcttgattca gagttgtgga 60
aaattctccc agtgtcaggg attgacagga acagggtctc tctgtgtctc actttacctg 120
ctgtgtttct gctggaaaag gagggaagag gactggctga tttttacctc atgtctccca 180
gtttttcata ttcttcttgg atctctctct ctgacaaagt ttcccttttg gtcttctctt 240
tcttgctcag agagcaggtc tctttaaacc tgagaaggga gaatgagcaa atgattaaag 300
aaaacacact tctgaggccc agagatcaaa tattaggtaa atactaaacc gcttgctctc 360
tgtggtcact tttctctctt tteacatgct ctatccctct atccccacc tattcatatg 420
gcttttatct gccaaagttat ccggcctctc atcaaccttc tcccctagcc tactggggga 480
tatccatctg ggtctgtctc tgggtgtatt gtgtcaagtg gccaaagctc a 531

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<210> 221

<211> 530

<212> DNA

<213> Homo sapien

<400> 221

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attgacgctt ggccacttga caccgcctg cctgcaatac tggggcaagg gcttccactg 60
ctttctctgc accagctgcc actgcacaca gagatcagaa atgctaccaa ccaagaactgt 120
tggctctcag cctctctgag gaaaaagagc agaagcctgg aagtcagaag agaagctaga 180
tcggctacgg ccttggcagc cagcttcccc acctgtggca ataaagtcgt gcatggctta 240
acaatggggg cacctctctg gaaacacatt gttaggcaat tcggcgtgtg ttcacacagc 300
catatttaca caaacctcga tagtgcagcc taatatccac tahtgtctct acgtgcara 360
cctgaacagc atgggaactgt actgaatact ggaagcaqct gctgatggta cttattttgtg 420
tatctaaaca cagagaaggt acagtaagaa tatggtatca taaacttaca gggaccgcca 480
tcctatatgc agtctgttgt gaccaaagt tgtcaagtg gccaaagctc 530

```

<210> 222

<211> 578

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1) ... (578)

<223> n = A,T,C or G

<400> 222

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tgtatcgacg tagtgggtctc cgggctacta ggccgttgtg tgctggtagt acctggttca 60
ctgaaaggcg catctccctc cccgcgtctc cctgaagcag ggggaggact tcgcccagcc 120
aaggcagttg tatgagtttt agctgaggca cttcgagacc tctgagccca cctccttcag 180
gagccttccc cgattaagga agccagggtg aggattcctt cctccccag acaccacgaa 240
caaaccacca cccccctat tctggcagcc catatacatc agaacgaaac aaaaataaca 300
aataaaacnaa aacaaaaaaa aaaagagaag gggaaatgta tatgtctgtc catcctgttg 360
ctttagcctg tcagctccta nagggcaggg accgtgtctt ccgaatggtc tgtgcagcgc 420

```

cgactgcggg aagtatcgga ggaggaagca gagtcagcag aagttgaacg gtgggcccgg 480
 cggctcttgg gggctggtgt tglacttcga gacccgttcc gctttttgtc ttagatttac 540
 gtttgccttt tggagtggga naccactacu tcnatata 578

<210> 223

<211> 578

<212> DNA

<213> Homo sapien

<400> 223

tgtatcgacg tagtgggtctc ctcttgcaaa ggactggctg gtgaatgggt tccctgaatt 60
 atggacttac cctaacata tcttctcacc attaccagtt gcaaacatt agaatgtgtt 120
 gtcactgttt catttgattc ctagaagggt agtcttagat atgttacttt aacctgtagt 180
 ctgtagtgtt ttgaatgat tttttgttg cctctttgtt tgcaccaact gtcaattata 240
 gctgcttagg tetggaactg cctggataaa gctgttaaaa tattcaccag tccagccatc 300
 ttacaagcta attaatgcaa ctaaatgctt ccttgttttg ccagacttgt tatgtcaatc 360
 ctcaattctt ggggtcattt tgggtgcctt aaatcttagg gtgtgacttt cctagcatcc 420
 tgtaacatcc attcccaagc aagcacaact tccataata cttccagaa gttcattgct 480
 gaagccttcc cttcaccag cggagcaact tgatcttcta caacttcctt catcagagcc 540
 acaagagtat gggatatgga gaccactacg tccatata 578

<210> 224

<211> 345

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1) ... (345)

<223> n = A, T, C or G

<400> 224

tgtatcgacg tagtgggtctc ccaaggtgct gggattgcag gcattgagcca ccactccag 60
 gtggatcttt ttctttatac ttactctcct aggtttctgt tattcaagaa gtgtagtgtt 120
 aaaagtcttt tcaatctaca tgyttaata atgatagcct gggaaataaa tagaaatttt 180
 ttctttcacc tttagggtga ataaaga agaaaaata gaacatactg aaaataatct 240
 aagttccaac catagaagaa ctgcagaaga aatgaagaaa gtgatgatga tttagatttt 300
 gatattgatt tagaagacac aggaggagac cactacgtcg ataca 345

<210> 225

<211> 347

<212> DNA

<213> Homo sapien

<400> 225

tgtatcgacg tagtgggtctc caaactgagg tatgtgtgcc actagcacac aaagccttcc 60
 aacagggacg caggcacagg cagtttaag ggaatctgtt totaaattaa ttccacctt 120
 ctctaagtat tctttcttaa aactgatcaa ggtgtgaagc ctgtgctctt tcccaactcc 180
 cctttgacaa cagccttcaa ctaacacaag aaaaggcatg tctgacactc ttctgagtc 240
 tgactctgat acgttggtct gatgtctaaa gagctccaga acaccaaggg gacaattcag 300
 aatgctgggtg tataacagac tccaatggag accactacgt cgataca 347

<210> 226

<211> 281

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1) ... (281)

<223> n = A,T,C or G

<400> 226

aggngnggga	ntgtatcgac	gtagtgggtct	cccaacagtc	tgtcattcag	tctgcagggtg	60
tcagtgtttt	ggacaatgag	gcaccattgt	caettattga	ctcctcagct	ctaaatgctg	120
aaattaaatc	ttgtcatgac	aagtctggaa	ttcctgatga	ggttttacaa	agtatttttg	180
atcaatactc	caacaaatca	gaaagccaga	aagaggatcc	tttcaatatt	gcagaaccac	240
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<210> 227

<211> 3646

<212> DNA

<213> Homo sapien

<400> 227

gggaaacact	tcctcccage	cttgtaagggt	ttggagccct	ctccagtata	tgctgcagaa	60
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actctgcaaa	gtagaatggc	caaagttttg	agttgagtggt	ccccttgaag	ggtcactgaa	180
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gtttccctac	attgatcaat	ggctgagttt	ggtcaggagc	accccttccg	tggtccact	300
catgcaccat	tcataatttt	acctccaagg	tcctcctgag	ccagaccgtg	ttttgcctc	360
gaccttcagc	cggttcggtt	cgccctgtac	tgccctctctc	tgaagaagag	gagagtctcc	420
ctcaccacagt	cccaccgcct	taaaaccagc	ctactccctt	agggtcaccc	catgtctect	480
cggctatgtc	ccctgtaggc	tcatacccca	ttgcctcttg	gttgcaaccg	tggtgggagg	540
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agctttttaga	gatagcctaa	aagggttttt	acagtcaaga	ggttgaaaaa	caaaaacaag	1260
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agatccccca	tcttcaaagc	ctaacagatc	aagcagctct	ccggtgcaca	acctgcgccc	2160
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accttctagt	actggttagac	accttctctg	gatggactga	agcatttgct	acaaaaaacg	2340
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aacagagccc	aactagaaac	atgggtcccc	agggtgggt	caggccctt	aaaactgcac	3060
ctaagttggg	tgaagccatt	agattaattc	ttttctttaa	ttttgtaaaa	caatgcatag	3120
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ttcctcaagg	acttaacttg	tgaagctga	ctccagcac	atccaagaat	gcaattaact	3420
gataagatac	tgtggcaagc	tatatcgca	gttccagga	attcgccaa	ttgatcacag	3480
ccctctacc	cttcagcaac	caccacctg	atcagtcagc	agccatcagc	accgaggcaa	3540
ggcctccac	cagcaaaaag	attctgactc	actgaagact	tggatgatca	ttagtatttt	3600
tagcagtaaa	gttttttttt	ctttttcttt	ctttttttct	cgtgcc		3646

<210> 228

<211> 419

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(419)

<223> n = A,T,C or G

<400> 228

taagagggtta	caagatctaa	gcacagccgt	caatgcagaa	cacagaacgt	agcctggtaa	60
gtgtgttaag	agtgggaatt	tttgagtag	agagtaaggc	acctaacct	agctgggggtt	120
tggtagcgg	ccagatggc	ttacagaaga	aagtgtcctg	agatgagttt	ttaagaatga	180
ataaggatag	acacaagtga	ggactgactt	ggcagtggtg	aatggtgggt	ggcaaaaaac	240
ttcgcatgta	tggaaactgc	acgtacagga	atgaagaatg	agactgtgtg	gtgtttaatg	300
agctgcaaat	actaatttta	tctgaaagt	tttgaagagt	taactaaaaa	gtatttttta	360
gtaaggaaat	aaccctacat	ttcagggtta	ttgtttgttt	anatattgaa	gggtgcccaa	419

<210> 229

<211> 148

<212> DNA

<213> Homo sapien

<400> 229

aagagggtac	ctgtatgtag	ccatgggtggc	aatgagagac	tgattactac	ctgctggaga	60
ttgtttaagt	gagttaatat	attaaggata	aaggagacca	ggttttttga	ctgttggaga	120
aggaaattac	agatattgaa	ggtcccaa				148

<210> 230
 <211> 257
 <212> DNA
 <213> Homo sapien

<400> 230

taagagggtgta cmaaaaaaaaaaaa	aaaatagaac	gaatgagtaa	gacctactat	ttgatagtag	60
aacagggtga ctatagtcas	tgataactta	attatacatt	taacatagag	tgtaattgga	120
ttgtttgttaa ctcgaaggat	aaatgcttga	gaggatggat	acccattct	ccatgatgta	180
cttatttcac attacatgcc	tgtatcsaag	catctcat	accctataaa	tatgtacacc	240
tactatgtac cctctta					257

<210> 231
 <211> 260
 <212> DNA
 <213> Homo sapien

<400> 231

taagagggtgta cgggtatttg	ctgatgggat	tttttttct	ttcttttct	ttggaaaaca	60
aaatgaaagc cagaacaaaa	ttattgaaca	aaagacaggg	actaaatctg	gagaaatgaa	120
gtccctcac ctgactgcca	tttcattcta	tctgaccttc	cagtctaggt	taggagaata	180
gggggtggag gggattaatc	tgatacaggt	atattttaaag	caactctgca	tgtgtgccag	240
aagtccatgg taccctctta					260

<210> 232
 <211> 596
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(596)
 <223> n = A,T,C or G

<400> 232

tgctcctctt gccttaccaa	ccacaaatta	gaaccataat	gagatgtcac	ctcatacctg	60
gtgggattaa cattatttaa	aaaatcagaa	gtattgacaa	ggatgtgaag	aaatcagaac	120
atctgtgcac tgttggtggg	aatgtaaaaa	aggtgtgycc	actatgggtg	acagcatgaa	180
ggttcctcaa aaaaaatttt	ttttaatcta	ctctatgac	gatcttgagg	ttgtttatgc	240
aaaagaactg aaatcaggat	tttgaggaaa	tattcacatt	cccacatcca	ttctcgcttt	300
attcataata ctcaagagat	ggauacaacc	taaatgtcca	tcccgggatg	aatggataaa	360
cacagtgtgg tatatgcata	caatgyaata	ttatttagtc	tttaaaaaga	aaaattctat	420
catatactac aacttanatn	aaccttgagg	acacaatgct	nagtgaata	agccacggaa	480
ggacgaatac tgcattatc	ccttatatga	agtatctaaa	gtgggtcaa	ac tcttanagca	540
naaagtaaaa atgggtggtt	gccanacagt	tgggttaggcn	agaaganaan	cctant	596

<210> 233
 <211> 96
 <212> DNA
 <213> Homo sapien

<400> 233

tcttctgaag acctttcgcg	actcttaagc	tctgtggttg	taaggcaaga	ggagcgttgg	60
taaggcaaga ggagcgttgg	taaggcaaga	ggagca			96

<210> 234
 <211> 313
 <212> DNA
 <213> Homo sapien

<400> 234
 tgtaagtcga gcagtgatgataaaaactt gaatggatca atagttgctt cttatggatg 60
 agcaaagaaa gtatgtttctt ctgattggaat ctgctcctgg caaaaatgct gtgaacgttg 120
 ttgaaaagac aacaaagagt tttagagtagt acataaattt agaatagtag ataaacttag 180
 aatagtacat aaacttagta cataaataat gcacgaagca ggggcagggc ttgagagaat 240
 tgacttcaat ttggaaagag tatctactgt aggttagatg ctctcaaaca gcacacact 300
 gctcgactta caa 313

<210> 235
 <211> 550
 <212> DNA
 <213> Homo sapien

<400> 235
 aacgaggaca gatccttaaa aagaatgttg agtgaaaaaa gtagaaaata agataatctc 60
 caaagtccag tagcattatt taaacatttt taaaaaatac actgataaaa attttgtaca 120
 tttcccaaaa atacatatgg aagcacagca gcatgaatgc ctatgggrtt gaggataggg 180
 gttgggagta gggatgggga taaaggggga aaataaaacc agagaggagt cttacacatt 240
 tcatgaacca aggagtataa ttatttcaac tatttgtacc wgaagtccag aaagagtggg 300
 ggcagaaggg ggagaagagg gcgaagaac gtttttggga gaggggtccc asaagagaga 360
 ttttcgcgat gtggcgctac atacgttttt ccaggatgac ttaagctctg caccctattt 420
 ttctcatcac taatattaga ttaaaccctt tgaagacagc gtctgtggtt tctctacttc 480
 agctttccct ccgtgtcttg cacacagtag ctgttttaca agggttgaac tgactgaagt 540
 gagattattc 550

<210> 236
 <211> 325
 <212> DNA
 <213> Homo sapien

<400> 236
 tagactgact catgtccctt accagagtag ctagaattaa tagcacaagc ctctacaccn 60
 aggaactcac tattgaatac ataatggaa tttattcagc cttaaaagt ttggaaggaa 120
 attctgacat atgctaaaac atggatgaac cttgaagact ttatgataag taaaagaagc 180
 cagtcataaa aggaaaaata ttgcatgatt ccacttatat gaggtaccta gagttagtcaa 240
 tttcatagaa acacaaaata gaatgggtgt tgccagggct tttgaggaaa agggaatgac 300
 aagttagggg acatgagtcg gtcta 325

<210> 237
 <211> 373
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1) ... (373)
 <223> n = A, T, C or G

<400> 237

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tagactgact catgtccctt atctactcaa catttccact tgaagtctga taggcatctc      60
agacttatct tgtcccaaag caaactcttt atttcttttc atctagtctt ttatttcttg      120
tgctgtctta cccatctcaa aagagtgcc aatccacca agttgctgaa acagaaatct      180
aagaaatata cttgattctt ctttttccca tctacttcac ttctaattca ttagtaaata      240
atctgtttca gaaaaccaa cactcatgt tctactcat aagggggagt tgaacaatga      300
gaacacacag acacagggag gggaacatca cacaccagg cccgtcaggg agtangggag      360
atgagtcagt cta                                     373

```

<210> 238

<211> 492

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(492)

<223> n = A,T,C or G

<400> 238

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tagactgact catgtccctt ataatgctcc caggcatcag aaagcatctc aaactggagc      60
tgacaccatg gcagagggtt caggtaagtc acaaaagggg tctaaagaa tttgccctca      120
atatcagagt gattagaaga agtggacaga gctaccaag ttaacatat gcgagataaa      180
aaaaatatgg cacttgtgaa cacacactac aggaggaaaa taagggaacat aatagcatat      240
tgtgtatta tgatgatgaa gaacctctct anaagaaaac ataaccaag aaacaaagaa      300
aattcctgcn aatgtttaat gctatagaag aaattaacaa aaacatatat tcaatgaatt      360
cagaaaagtt agcaggtcan aagaaaacaa atcaaagacc agaataatcc cattttagat      420
tgtcgagtaa actanaacag aaagaatacc actggaaatt gaattcctac gtangggaca      480
tgantcantc ta                                     492

```

<210> 239

<211> 482

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(482)

<223> n = A,T,C or G

<400> 239

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tggaaagtat ttaatgatgg gcaacttgct gtttacttec tacatatccc atcatcttct      60
gtattttttt aaataacttt tttttggatt tttaaagtaa ccttattctg agaggtaaca      120
tggattacat acttctaagc cattaggaga ctctatgtta aaccaaaagg aaatgttact      180
agatcttcat ttgatcaata ggatgtgata atcatcatct ttctgcteta atggaaaagt      240
actanaaaca tggaaaccata atcttagatg aacaacgtta gaatttgac taattctacg      300
gaatttcagt aattcgcaa atgtcgggca gtgacacaac atttcatgac ggggacgcat      360
ctaccaactt ctggcgataa gggccaccct tccctctgta cttacagtcc catttcatac      420
acagtctttg attaaatatt cacatttttt ctctacpcaa agaccttcaa gaccagtaag      480
ta                                     482

```

<210> 240

<211> 519

<212> DNA

<213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)... (519)
 <223> n = A,T,C or G

<400> 240

tgtatcgacg tagtgggtctc cccatgtgat agtctgaaat atagcctcat gggatgagag	60
gctgtgcccc agcccgacac ccgtaaaggg tctgtgctga ggtggattag taaaagagga	120
aagccttgca gttgagatag aggaagggca ctgtctctcg cctgcccctg ggaactgaat	180
gtctcggtat aaaaccgat tgtacatttg ttcaattctg agataggaga aaaaccaccc	240
tatggcggga ggcgagacat gttggcagca atgctgcctt gttatgcttt actccacaga	300
tgtttgggcg gagggaaaca taaatctggc ctacgtgcac atccaggcat agtacctccc	360
tttgaactta attatgacac agattccttt gctcacatgt ttttttgctg acctctcct	420
tattatcacc ctgctctcct accgcattcc ttgtgctgag ataatgaaaa taatatcaat	480
aaaaacttga nggaactcgg agaccactac gtcgataca	519

<210> 241
 <211> 771
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)... (771)
 <223> n = A,T,C or G

<400> 241

tgtatcgacg tagtgggtctc cactcccggc ttgacggggc tgctatctgc cttccaggcc	60
actgtcacgg ctcccgggta gaagtcactt atgagacaca ccagtgtggc cttgttggct	120
tgaagctcct cagaggaggg tggaacaga gtgaccgagg gggcagcctt gggctgacct	180
aggacgggtca gcttgggtccc tccgccaaac acgagagtgc tgctgcttgt atatgagctg	240
cagtaataat cagcctcgtc ctccagctgg agcccagaga tggtcaggga ggcctgtgtg	300
ccanacttgg agccagagaa gcgattagaa acccctgagg gccgattacc gacctcataa	360
atcatgaatt tgggggcttt gectgggtgc tgttgggtacc angagacatt attataacca	420
ccaacgtcac tgctgggtcc antgcaggga aaatgggtga tcnaactgtc caagaaaacc	480
actacgtcca taccaatcca ctaattgccn gccgcctgca ggttcaacca tattggggaa	540
naactcccn ccgcgcttg ggattgncat naaccttga aattttttcc tattanttgt	600
ccccctaaaa taaacnttg ggcnttaate cattgggtcc atancttnt tncccggttt	660
ttaaanttg tttatccgc cncnctatt ccccccaac tttccaaaac ccgaaacct	720
tnaaattnt tnaaacctg ggggggtccc nnaattnnan ttnaanctnc c	771

<210> 242
 <211> 167
 <212> DNA
 <213> Homo sapien

<400> 242

tgggcacctt caatatcggt ctcacgata acatcacgct gctgatgctg ctggtgctgg	60
tcctctctag gaacctctgg attttcaaatt tctttgagga attcatccaa attatctgcc	120
tctctcctt tctcctttt tctaaggtct tctggtacaa gcggtca	167

<210> 243
 <211> 338
 <212> DNA
 <213> Homo sapien

tggaaccaat ccaaataccc atcaatgata gactggataa agaaaatttg gcacatgttc 60

accatgaaat	actatgcagc	cataaaaaag	gatgagttca	tatcctttgc	agggacatgg	120
atgaagctgg	agaccatcat	tctcagcaaa	ctaacaaggg	aacagaaaac	caaacactgc	180
atgttctcac	tcttaagtgg	gagctgaaca	atgagaacac	atggacacag	ggaggggaac	240
atcacacagt	ggggcctgct	ggtgggtagg	ggtctagggg	agggatagca	ttaggagaaa	300
tacctaattg	agatgacggg	ttgatgggtg	cagcaaacca	ccatgacacg	tgtataccta	360
tgtaacaaac	ctgcatgttc	tgacatgta	ccccagaact	taaagtgtta	ataaaaaaat	420
taagaaaaaa	gttaagtatg	tcatagatac	ataaaatatt	gtanatattg	aaggtgcccc	480
aa						482

<210> 247
<211> 474
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(474)
<223> n = A,T,C or G

<400> 247	
ttcgatacag	gcacagagta agcagaaaaa tggctgtggt ttaaccaagt gagtacagtt 60
aagttagaga	ggggcagaga agacaagggc atatgcaggg ggtgattata acaggtggtt 120
gtgctgggaa	gtgaggggtac tccgggatga ggaacagtga aaaagtggca aaaagtggta 180
agatcagtga	attgtacttc tccagaattt gatttctggn ggagtcaa atactatccag 240
tttgggttat	catanggcaa cagttgaggt ataggaggta gaagtcncag tgggataatt 300
gaggttatga	anggttttgt actgactggt actgacaang tctgggttat gaccatggga 360
atgaatgact	gtanaagcgt anaggatgaa actattccac ganaaagggg tccnaaaact 420
aaaaannnaa	gnnnnngggg aatattattt atgtggatat tgaangtgcc caaa 474

<210> 248
<211> 355
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(355)
<223> n = A,T,C or G

<400> 248	
ttcgatacag	gcaaacatga actgcaggag ggtgggtgacg atcatgatgt tgccgatggt 60
ccggatggnc	acgaagacgc actggancac gtgcttacgt cctttttgctc tgttgatggc 120
cctgagggga	cgcaggaccc ttatgacct cagaatcttc acaacgggag atggcactgg 180
attgantccc	antgacacca gagacacccc aaccaccagn atatcantat attgatgtag 240
ttcctgtaga	nggccccctt gtggaggaaa gctccatnag ttggtcatct tcaacagyat 300
ctcaacagtt	tccgatggct gtgatgggca tagtcatant taacntgtn tcgaa 355

<210> 249
<211> 434
<212> DNA
<213> Homo sapien

<400> 249	
ttggattggt	cctccaggag aacaagggga aaaaggtgac cgaggggtcc ctggaactca 60
aggatctcca	ggagcaaaaag gggatggggg aattcctggt cctgctgggc ccttaggtcc 120

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acctggctct ccaggcttac caggtcctca aggcccaaag ggtaacaaag gctctactgg 180
acccgctggc cagaaagggt acagtgggtc tccagggcct cctgggcctc caggteccacc 240
tggtgaagtc attcagcctt taccaatctt gtctccaaa aaaacgagaa gacatactga 300
aggcatgcaa gcagatgcag atgataatat tcttgattac tcggatggaa tggaagaaat 360
atttggttcc ctcaattccc tgaacaaga catcgagcat atgaaatttc caatgggtac 420
tcagaccaat ccaa 434

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<210> 250

<211> 430

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1) ... (430)

<223> n = A, T, C or G

<400> 250

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tggattggtc acatggcaga gacaggattc caaggcagtg agaggaggat acaatgcttc 60
tcactagtta ttattattta ttttattttt gagatgaagt ctgcctttgt ctcccaggct 120
ggagagcggg ggtgcgatct tggtctcttg caacccccgc ctcaagcaat tctctgtct 180
tagcctcgcg ggtagatgga attacaggcg cccaccgcca tgcccaacta atttttttgt 240
gtcttcagta gagacagggt ttcgccatgt tgggcaggct ggtcttgaac tctgacctc 300
nagtgatctg cctcctcgg cctcacaag tgctggaatt acaggcatgg gctgctgcac 360
ccagtcaact tctcactagt tatggcctta tcattttcac cacattctat tggcccaaaa 420
aaaaaaaaan 430

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<210> 251

<211> 329

<212> DNA

<213> Homo sapien

<400> 251

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tggactccca ccatyatggg gtcaaccgcc atctctgccc tctcctggc tgttctccaa 60
ggagtctgtg ccgagggtgca gctgrtgag tctggagcag aggtgaaaaa gtccggggag 120
tctctgaaga tctcctgtaa gggttctgga tacaccttta agatctactg gatcgctctg 180
gtgcgccagt tgcccgaggaa aggcctggag tggatggggc tcatctttcc tgatgactct 240
gataccagat acagcccgtc ctccaaggc caggtcacca tctcagtcga taagtccatc 300
agcaccgctt atctgcagtg gagtaccaa 329

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<210> 252

<211> 536

<212> DNA

<213> Homo sapien

<400> 252

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tggactccca ctccagcccaa ccttaattaa gaattaagag ggaacctatt actattctcc 60
caggctcctc tgcctcaacc aggcctctgg gacagtatta gaaaaggatg tctcaacaag 120
tatgtagatc ctgtactggc ctaagaagtt aaactgagaa tagcataaat cagaccaaac 180
ttaatggtcg ttgagacttg tgcctggag cagctgggat aggaaaactt ttgggcagca 240
agaggaagaa ctgcctggaa gggggcatca tgttaaaaaa tacaagggga acccacacca 300
ggcccccttc ccagctctca gcttagagta ttagcatttc tcagctagag actcacaact 360
tcottgctta gaattgtgca ccggggggag tccctgtggg tgatgaggct ctcaagagtg 420
agagtggcat cctatcttct gtgtgccac aggagcctgg cccgagactt agcaggtgaa 480
gtttctggtc caggctttgc ccttgactca ctatgtgacc tctgggtggag taccaa 536

```


<210> 253
 <211> 507
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(507)
 <223> n = A,T,C or G

<400> 253
 ntgttgcgat cccagtaact cgggaagctg aggcgggagg atcacctgag ctcaggaggt 60
 tgaggccgca gtgagccggg accacgccac tacactccag cctggggcat agagtgagac 120
 cctccaagac agaaaagaaa agaaaggaag ggaaagggaa agggaaaagg aaaaggaaaa 180
 ggaaaaggaa aaggaaaaga caagacaaaa caagacttga atttggatct cctgacttca 240
 attttatgtt ctttctacac cacaattcct ctgcttacta agatgataat ttagaaaccc 300
 ctggttccat tctttacagc aagctggaag tttggtcaag taattacaat aatagtaaca 360
 aatttgaata ttatatgcca ggtgtttttc attcctgctc tcaacttaatt ctcaccactc 420
 tgatataaat acaattgctg ccgggtgtgg tggctcatgc ctgtaatccc ggcactttgg 480
 gagaccgagg tgggaggats gcaacaa 507

<210> 254
 <211> 222
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(222)
 <223> n = A,T,C or G

<400> 254
 ttggattggc cactgtgagg aagccaaatc ggatccgaga gtctttttct aaaggccagt 60
 actggccaca ctttctcctg cgccttccct caaagctgaa gacacacaga gcaaggcgct 120
 tctgttttac tccccaatgg taactccaaa ccatagatgg ttagctnccc tgctcatctt 180
 tccacatccc tgcatttcag tatagtcgg ggaccaatcc aa 222

<210> 255
 <211> 463
 <212> DNA
 <213> Homo sapien

<400> 255
 tgttgcgata cataaatgct gaaatggaaa taaacaacat gatgagggag gattaagttg 60
 gggagggagc acattaaggt ggccatgaag tttgttgga gaagtgactt ttgaacaagg 120
 ccttggtgtt aagagctgat gagagtgtcc cagacagagg ggccactggt acaatagacg 180
 agatgggaga gggcttggaa ggtgtgcgaa ataggaagga gtttgttctg gtatgagtct 240
 agtgaacaca gaggcgagag gccctggtgg gtgcagctgg agagtatatc agaataacat 300
 taggacctgt gggggactgt agactgtcag caataatcca cagtttggat tttattctaa 360
 gagtgatggg aagccgtgga aaggggggta agcaaggagt gaaattatca gatttacagt 420
 gataaaaata aattggtctg gctactgggg aaaaaaaaaa aaa 463

<210> 256
 <211> 262

<212> DNA

<213> Homo sapien

<400> 256

ttggattggt caacctgctc aactctacyt ttctctcttc ttctctaaaaa attaatgaat	60
ccaatacatt aatgccaaaa cccttggggt ttatcaatat ttctgtctaaa aagtattatc	120
cagaactgga cataatacta cataataata cataacaacc ccttcactctg gatgcaaaca	180
tctattaata tagcttaaga tcactttcac ttacagaag caacatcctg ttgatgttat	240
tttgatgttt ggaccaatcc aa	262

<210> 257

<211> 461

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(461)

<223> n = A,T,C or G

<400> 257

gnggmnnnnnn nnncaattcg actengttcc cntggtance ggtcgacatg gccgcgggat	60
taccgcttgt mnetgggggt gtatggggga ctatgaccgc ttgtagctgg ggggtgtatgg	120
gggactatga ccgctttag mtggkgggtg atgggggact atgaccgctt gtcgggtggt	180
cggataaacc gacgcaaggg acgtgatcga agctgcgttc ccgctcttcc gcacgcgtag	240
ggatcatgga cagcaatata cgcattcgyt tgaaggcgtt cgaccatcgc gtgctcgatc	300
aggcgaccgg cgacatcgcc gacaccgcac gccgtaccgg cgcgctcacc cgcgggtccga	360
tcccgcttcc caccgcgcatc gagaagttca cgggtcaaccg tggcccgcac gtcgacaaga	420
agtcgcgcga gcagttcgag gtgcgtacct acaagcggtc a	461

<210> 258

<211> 332

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(332)

<223> n = A,T,C or G

<400> 258

tgaccgcttg tagctggggg tgtatggggg actacgaccg cttgtagctg ggggtgtatg	60
ggggactatg accgcttgta gctgggggtg tatgggggac tatgaccgct ttagctggg	120
ggtgtatggg ggactaggac cgctttagtc tgggggtgtg tgggggacta tgaccgcttg	180
tagctggggg tgtatggggg actacgaccg cttgtagctg ggggtgtatg ggggactatg	240
accgcttgta nctgggggtg tatgggggac tatgaccgct tgtgctgctt gggggatggg	300
aggagagttg tgggtgggga aaaaaaaaaa aa	332

<210> 259

<211> 291

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1) ... (291)

<223> n = A,T,C or G

<400> 259

taccgcttgt gaccgcttgt gaccgcttgt gaccgcttgt gaccgcttgt gaccgcttgt	60
gaccgcttgt gaccgcttgt gaccgcttgt gaccgcttgt gaccgcttgt gaccgcttgt	120
gaccgcttgt gaccgcttgt nacnggggggt gtctggggga ctatgannga ntgtactgg	180
gggtgtctgg ggggctatga nngantgtna cnggggggtgt ctgggggact atganngact	240
gtgcnnccctg ggggacnnga ggagantngn ggntagnat ggttngggan a	291

<210> 260

<211> 238

<212> DNA

<213> Homo sapien

<400> 260

taagagggta ctggttaaaa tacaggaat ctggggtaat gaggcagaga accaggatac	60
tttgaggtca gggatgaaaa ctagaatttt ttcttttttt ttgcctgag aaacttgctg	120
ctctgaagag gcccatgtat taattgcttt gatcttcctt ttcttacagc cctttcaagg	180
gcagagccct ccttatcctg aaggaaatctt atccttagct atagtatgta ccctctta	238

<210> 261

<211> 746

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1) ... (746)

<223> n = A,T,C or G

<400> 261

ttgggcacct tcaatatcaa tagctaacat ttattgagt tttatcgtat cataaaacac	60
tggttctaagc ctttaaacgt actaattcat ttaatgctca taatcacttt agaagggtggg	120
tactagtatt agtctcattt acagatgcaa catgcaggca cagagagggt aattaacttg	180
cccaaggtaa cacagctaag aaatagaaaa aatattgaat ctggaaaagt gggcttctgg	240
gtaaccacac gagtcttcaa tgagcctggg gcctcactca gtttgctttt acaaagcgaa	300
tgagtaacat cacttaattc agtgagtagg ccaaatggag gtcagctacg agtttctgct	360
gttcttgcag tggactgaca gatgtttaca acgtctggcc atcagtwaat ggactgatta	420
tcattgggaw gtgggtgggc tgaatgttgg ccagtgaagt ttattcawgc catattttta	480
tggttaggat gacttttggc tggctctagg gcaagctctg tctgscacgg aacacagaat	540
wacacagggg cccctcaat ttctgggtgt gctagaacca tgaaccactg gttgggggaa	600
caagcgttca aaacctaat ggggcgctt ggcagggtcc acccatatgg ggaaaactcc	660
cnacgcgttt ggaatgctn agctngaatt attctaanag ttgtccnctt aaaattagcc	720
tgggcgttaa tcangggctn naagcc	746

<210> 262

<211> 588

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1) ... (588)

<223> n = A,T,C or G

<400> 262

tgaccgcttg	tcattctaca	tggggctctg	cacgcttttg	cctttgtagg	aaacctgaca	60
tttgtctgtt	tcttctttct	cttttcttct	ccatattctc	ctaatttacg	tttgacttgt	120
ttgctgagga	ggcaggagct	agagactgct	gtgagctcat	aggggtggga	agtttatcct	180
tcaagtcctg	cccactcatc	actgcttctc	accttccctc	gaccaggctt	acaagtgggt	240
tcttgctgct	tttccctttg	gacccaacaa	gccccgttaa	tgagtgtgca	tgactctgac	300
agctgtggac	tcagggtcct	tggctacagc	tgccatgtaa	aatatctcat	ccagttctcg	360
caaattgtta	aaataaccac	atttcttaga	ttccagtacc	caaatcatgt	ctttacgaac	420
tgctctctac	accagaagt	ggcacaataa	ttcttgggga	attattactt	tttttttct	480
ctctnttnc	gnnnngnnng	gnnnngccag	gaattaccac	nttggaagac	ctggccngaa	540
tttattatan	aggggagccg	attnttttct	ctaacacaaa	gcgggtca		588

<210> 263

<211> 730

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1) ... (730)

<223> n = A,T,C or G

<400> 263

tttttttttt	tttggcctga	gcaactgaaa	ttatgaaatt	tcataact	caaaagagta	60
agactgcaaa	aagattaaat	gtaaaagttg	tcttgataac	agtaatgttt	aagataccta	120
ttanatttat	aatggaaaa	ttagggcatt	tggatataca	agttgaaaat	tcaggagtga	180
ggttgggctg	gctgggtata	tactgaaaac	tgtcagtaca	cagatgacat	ctaaaaccac	240
aaatctggtt	ttatttttagc	agtgatattg	gtcactccca	caaaagcctt	cccaattggc	300
ctcagcatac	acaacaagtc	acctccccac	agccctctac	acataaacia	attccttagt	360
ttagtccagg	aggaaatgct	cccttttctc	tccgctctag	gtgaccgcaa	ggcccagttc	420
tcgtcaccaa	gatgttaagg	gaagtctgcc	aaagaggcat	ctgaaaggaa	ataaggggaa	480
tgggagtgc	cacaaaggaa	agccaaggan	aaactttgga	gaccgtttct	aganccctgg	540
catttcacaa	caaaactcng	gaacaaacct	tgtctcatca	atcatttaag	cccttcgttt	600
ggannagact	ttctgaactg	ggcgctgaac	ataancctca	ttgaatgtct	tcacagtctc	660
ccagctgaag	gcacaccttg	ggccagaagg	ggaatcttcc	aggtcctcaa	nacagggtctc	720
gccctttgnc						730

<210> 264

<211> 715

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1) ... (715)

<223> n = A,T,C or G

<400> 264

tttttttttt	tttggccagt	atgatagtct	ctaccactat	attgaagctc	ttaggtcatt	60
tacaottaat	gtggttatag	atgctgttga	gcttacttct	accaccttgc	tatttctccc	120
gtctcttttt	tgttcctttt	ctcttctttt	cctcccttat	tttataattg	aatttttttag	180
gattctatct	tatatagatt	tatcagctat	aacactttgt	attcttttgt	tttgtgggtc	240
ttctgtcatt	tcaatgtgca	tcttaaacct	atcacatct	atcttcaaat	aatatcatat	300
aaccttacat	ataatgtaag	aatctaccac	catatatttc	catttctccc	ttccatccta	360

tgtntgtcat attttttccct ttatatatgt tttaaagaca taatagtata tgggaggttt 420
ttgcttaaaa tgtgatcaat attccttcaa ngaaacgtaa aaattcaaaa taaatntctg 480
tttattctca aatnnaccta atatttccta ccatntctna tacntttcaa gaatctgaag 540
gcattgggttt tttccggctt aagaacctcc tctaaagcac tctaagcaga attaatgttt 600
ctgggagagg aattctccca agcttgggccc tthanngtga etccntnang gttaaanttt 660
ggccgggaaa tagaaattcc aagttaacag gntanttttt nttttntn tncc 715

<210> 265

<211> 152

<212> DNA

<213> Homo sapien

<400> 265

tttttttttt tttcccaaca caaagcacca ttatctttcc tcacaatttt caacatagtt 60
tgattcccat gaagagggtta tgatttctaa agaaaacatg gctactatac tatcaatcag 120
ggttaaattct tttttttttg agacggagtt ta 152

<210> 266

<211> 193

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)... (193)

<223> n = A,T,C or G

<400> 266

taaactccgt ccccttctta atcaatatgg aggetacca ctccacatta ccttcttttc 60
aagggactgt ttcogtaact gttgtgggta ttcacgacca ggetttctaaa cctcttaaaa 120
ctccccaatt ctggtgccaa cttggacaac atgctttttt tttttttttt tttttttttt 180
gagacggagt tta 193

<210> 267

<211> 460

<212> DNA

<213> Homo sapien

<400> 267

tgttgcatc ccttaagcat ggggtgtatt aaaaaaatgg tggagaagaa aatacctgga 60
atttacgtct tatcttttaga gattgggaag accctgatgg aggacgtgga gaacagcttc 120
ttcttgaatg tcaattccca agtaacaaca gtgtgtcagg cacttgctaa ggatcctaaa 180
ttgcagcaag gctacaatgc tatgggattc tcccaggag gccaatctct gagggcagtg 240
gctcagagat gcccttcacc tcccatgato aatctgatct cggttggggg acaacatcaa 300
ggtgtttttg gactccctcg atgcccagga gagagctctc acatctgtga cttcatccga 360
aaaacactga atgctggggc gtactccaaa gttgttcagg aacgcctcgt gcaagccgaa 420
tactggcatg acccataaaa ggaggatgtg gatcgcaaca 460

<210> 268

<211> 533

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1) ... (533)

<223> n = A, T, C or G

<400> 268

tggtgcgac	cgttgataga	atagcgacgt	ggtaatgagt	gcattggcacg	cctccgactt	60
accttcgccc	gtggggaccc	cgagtacgtc	tacggcgctcg	tcacttagag	tacctctctg	120
acgcccgggc	gcgttcgatt	taccggaagc	gcgagctgca	gtgggcttgc	gccccgggcc	180
aaattctttg	gggggtttaa	ggcgcggggg	aatttgaggt	atctctatca	gtatgtagcc	240
aagttggaac	agtcgccatt	cccgaaatcg	ctttctttga	atccgcaccg	cctccagcat	300
tgccctattc	atcaacctga	aggcagcat	aagtgaacgt	tgtgtcttca	gcagctccac	360
tccataacta	gcgcgctega	cctcgtcttc	gtacgcgcca	ggtcgctgcg	tgcaaatcc	420
caactcgggt	gagttgcgca	tttcaagtn	cgaaactgtt	cgctccacn	atttggcatg	480
ttcacgcattg	acacggaata	aactcgtcca	gtaccgggaa	tgggatcgca	aca	533

<210> 269

<211> 50

<212> DNA

<213> Homo sapien

<400> 269

tttttttttt	ttcgcctgaa	ttagctacag	atctctctca	caagcgggtca	50
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<210> 270

<211> 519

<212> DNA

<213> Homo sapien

<400> 270

tggtgcgac	caaataaccc	accagcttct	tgcacacttc	gcagaagcca	cgcctctttg	60
gctgagtcac	gtgaacggtc	agtgcaagca	gccgcgtgcc	agagcagagg	tgcagcatgc	120
tgcacaccag	ctcagggtcg	acctcctcca	gcaggatgga	caggatggag	ctgcccgtacg	180
tgtccaccac	ctcctggcac	tcttcgaca	gggacttcgg	cagcttcgag	cacattttgt	240
caaaagcgtc	gagtatctct	ttctcagctc	tggtgttgtc	aatcagcttg	gtcacctcct	300
tcaccaggaa	ttcacacacc	tcacagtaaa	catcagactt	tgctgggacc	tcgtgcttct	360
taatgggctc	caccagttcc	agggcaggga	tgacattott	ggaggccact	ttggcgggga	420
ccagagctctg	catgggcac	tctttcacct	catcacagaa	cccaaccagc	gcacagatct	480
ccttgggttg	catgtgcac	atcatctggg	atcgcaaca			519

<210> 271

<211> 457

<212> DNA

<213> Homo sapien

<400> 271

tttttttttt	ttcggggcggc	gaccggacgt	gcactcctcc	agtagcggct	gcacgtcgtg	60
ccaatggccc	gctatgagga	ggtgagcgtg	tccggcttcg	aggagtcca	ccggggccgtg	120
gaacagcaca	atggcaagac	catttttcgcc	tactttacgg	gttctaagga	cgcggggggg	180
aaaagctggg	gccccgactg	cgtgcaggct	gaaccagctg	tacgagaggg	gctgaagcac	240
attagtgaag	gatgtgtgtt	catctactgc	caagtaggag	aagagcctta	ttggaaagat	300
ccaaataatg	acttcagaaa	aaacttgaaa	gtaacagcag	tgctacact	acttaagtat	360
ggaacacctc	aaaaactggg	agaatctgag	tgtcttcagg	ccaacctggg	ggaaatgttg	420
ttctctgaag	attaagattt	taggatggca	atcaaga			457

<210> 272

<211> 102

<212> DNA
<213> Homo sapien

<400> 272

tttttttttt	ttgggcaaca	acctgaatac	cttttcaagy	ctctggcttg	ggctcaagcc	60
cgcaggggaa	atgcaactgg	ccaggtcaca	gggcaatcaa	ga		102

<210> 273
<211> 455
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(455)
<223> n = A,T,C or G

<400> 273

tttttttttt	ttggcaatca	acaggtttaa	gtcttcggcc	gaagttaatc	tcgtgttttt	60
ggcaatcaac	aggtttaagt	cttcggccga	agttaatctc	gtgttttttg	caatcaacag	120
gtttaagtct	tcggccgaag	ttaatctcgt	gtttttggca	atcaacaggt	ttaagtcttc	180
ggccgaagtt	aatctcgtgt	ttttggcaat	caacaggttt	aagtcttcgg	ccgaagttaa	240
tctcgtgttt	ttggcaatca	acaggtttaa	gtcttcggcc	gaagttaatc	tcgtgttttt	300
ggcaatcaag	aggtttaagt	cttcggccga	agttaatctc	gtgttttttg	caatcaacag	360
gtttaagtct	tcggccgaan	ttaatctcgt	gtttttggca	atcaacaggt	ttaantcttc	420
ggccgaagtt	aatctcgtgt	ttttggcaat	caana			455

<210> 274
<211> 461
<212> DNA
<213> Homo sapien

<400> 274

tttttttttt	ttggccaata	cccttgatga	acatcaatgt	gaaaatcctc	ggtaaaatac	60
tggcaaacca	aatccagcag	cacatcaaaa	agcttatcca	ccatgatcaa	gtgggcttca	120
tccctgggat	gcaaggctgy	ttcaacataa	gaaaatcaat	aaatgtaatc	catcacataa	180
acagaaccaa	agacaaaaac	cacatgatta	tctcaataga	tgcagaaaag	gccttggaca	240
aattcaacag	cccttcatgc	taaacactct	taataaacta	gatattgatg	gaatgtatct	300
caaaataata	agagctatct	atgacaaacc	cacagccaat	atcatactga	atgggcaaag	360
actggaagca	ttccctttga	aaactggcac	aagacaagga	tgcctctctc	caccgctcct	420
attcaacata	gtattggaag	ttctggccag	ggcaatcaag	a		461

<210> 275
<211> 729
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(729)
<223> n = A,T,C or G

<400> 275

tttttttttt	ttggccaaca	ccaagtcttc	cacgtgggag	gttttattat	gttttacaac	60
catgaaaaca	taggaagggtg	gctgttacag	caaacatttc	agatagacga	atcggccaag	120

ctccccaaac	cccaccttca	cagcctcttc	cacacgtctc	ccanagattg	ttgtccttca	180
cttgcaaatt	canggatgtt	ggaagtngac	atttnnagtn	gcnggaaccc	catcagtga	240
ncantaagca	gaantacgat	gactttgana	nacanctgat	gaagaacaon	ctacnganaa	300
ccctttctnt	cgtgttanga	tctcnngtcc	ntcactaatg	cggecccttg	cnggtccacc	360
atttgggaga	actccccccn	cgttggatcc	ccccttgagt	ntcccattct	ngtccccan	420
accngnettg	ngngncantn	cnnctcnca	cctgtttcc	ctgngtnaa	aatnngtttt	480
nccgcncccc	naattcccac	ccnaatcaca	gcgaancng	aaggectten	naagtgttta	540
angeccngng	gtttcctcnt	ntanttgacg	cctaccctcc	cnettnnnnt	tnogngttgg	600
tcggcccttg	gnncgcctn	gttctctttt	nnggnnaca	cctngntenn	nggcncten	660
nnctnttcc	tnnnactagc	tngcetntcc	ncnccgnggn	ncanngcaca	ttncnennac	720
tntgtnncc						729

<210> 276

<211> 339

<212> DNA

<213> Homo sapien

<400> 276

tgacctgaca	tgtagtagat	acttaataaa	tatttgtgga	atgaatggat	gaagtggagt	60
tacagagaaa	aatagaaaag	tacaaattgt	tgctcagtgtt	ttgaaggaaa	attatgatct	120
ttcccaaagt	tctgacttca	ttctaagaca	gggttagtat	ctccatacat	aattttactt	180
gcttttgaaa	atcaaattgag	ataatctatt	tagattgata	atttatttag	actggctata	240
aactattaag	tgctagcaaa	tatacatttt	aatctcattt	tccacctctt	gtgatatagc	300
tatgtagggtg	ttgactttaa	tggatgtcag	gtcaatccc			339

<210> 277

<211> 664

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)... (664)

<223> n = A, T, C or G

<400> 277

tgacctgaca	tccataacaa	aatctttctc	cattatattc	ttctagggga	atttcttgaa	60
aagcatccaa	aggaacaaa	tgatggtaag	accgtgccaa	gtggggagca	gacaccaaag	120
taagaccaca	gattttacat	tcaacaggta	gtcacagta	ctttgccoga	cactgtgggc	180
agaaatagcc	tcctaattgta	agccctggct	cagtattgcc	atccaaatgc	gccatgctga	240
aagagggttt	tgcatcctgg	tcagatnaag	aagcaatggt	gtgctgagga	aatcccatat	300
gaataagtga	gcattcagaa	cttgagctag	caggaggagg	actaagatga	tgtgtgagca	360
actctttgta	atggctttca	tctaaaataa	catggtaagt	gccaccagtt	tcacgagcaa	420
gtacagtgea	aacgcgaact	tctgcagaca	atccaataac	agatactcta	attttagctg	480
ccttttaggg	cttgattaaa	tcataaatat	tagatggatc	gcaagttgta	aggntgctaa	540
aagatgatta	gtacttctcg	acttgtatgt	ccaggcatgt	tgttttaaan	tctgccttag	600
nccctgctta	ggggaatttt	taaagaagat	ggctctccat	gttcanggtc	aatcacnaat	660
tgcc						664

<210> 278

<211> 452

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature
 <222> (1) ... (452)
 <223> n = A,T,C or G

<400> 278

tgacctgaca ttgaggaaga gcacacacct ctgaaattcc ttaggttcag aagggcattt	60
gacacagagt gggcctctga taattcatga aatgcattct gaagtcaccc agaattggagg	120
ctgcaatctg ctgtgctttg ggggttgect cactgtgctc ctggatatca cacaaaagct	180
gcaatccttc ttcttcaact aacatttttg agtattttgt gggattttta ctgcagacat	240
gatacatagc ccatagtgcc cagagctgaa cctctgggtg agagaagtgt ccaaggagcg	300
ggaaaaatgt cttgaaagat ctatagggtca ccaatgctgt catottacaa cttgaacttg	360
gccaatcttg tatgggttgc tgcagatctt ggagaagagt acgcctctgg aagtcacggg	420
atatccaaan ctgtctgtca gatgtcaggt ca	452

<210> 279

<211> 274

<212> DNA

<213> Homo sapien

<400> 279

tttttttttt ttgggcaagg caaatttact tctgcaaaag ggtgctgctt gcacttttgg	60
ccactgagag agcacaccaa acaagtagg gaaggggttt ttatccctaa cgcggttatt	120
ccctggttct gtgtcgtgtc cccattggct ggagtcagac tgcacaatct aactgaccc	180
aactggctac tgtttaaaat tgaatatgaa taattaggta ggaaggggga ggctgtttgt	240
tacggtacaa gacgtgtttg ggcattgtcag gtca	274

<210> 280

<211> 272

<212> DNA

<213> Homo sapien

<400> 280

tacctgacat ggagaaataa cttgtagtat tttgcgtgca atggaatact atatgagggt	60
gaaaatgaat gaactagcaa tgcgtgtatc aacatgaata aatccccaaa acataataat	120
gttgaatgga aaaggtgagt ttcagaagga tatatatgcc ctctaaatcc atttatgtaa	180
acctttaaaa aactacatta tttatgggtca taagtccatc cagaaaatat ttaaaaacct	240
acatgggatt gataactact gatgtcaggt ca	272

<210> 281

<211> 431

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1) ... (431)

<223> n = A,T,C or G

<400> 281

tttttttttt ttggccaata gcatgattta aacattggaa aaagtcaaag gagcaatgag	60
aatttttatg ttctcttgaa taatcaaaaag agtaggcaac attggttctt cattcttgaa	120
tagcattaat cagaaaatat tgcatagcct ctagcctcct tagagtaggt gtgctctctc	180
aaatatatca tagtcccaca gtttattttca tgtatatatt ctgcttgaat cacatagaca	240
tttgaatttg caacgcctga tgtaaatata taaattctta ccaatcagaa acatagcaag	300
aaattcaggg acttggtcat yatcagggta tgacagcana tccctgtara aacactgata	360

cacactcaca cacgtatgca acgtggagat gtcgcyttww kkktywown rmryerwecn 420
aatcacttan n 431

<210> 282
<211> 98
<212> DNA
<213> Homo sapien

<400> 282
attogattcg atgcttgage ccaggagttc aagactgcag tgagccactg cacttcagge 60
tggacaacag agcgagtcce tgtgccaaaa aaaaaaaaa 98

<210> 283
<211> 764
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1) ... (764)
<223> n = A,T,C or G

<400> 283
tttttttttt ttgcgaagca cgtgcacttt attgaatgac actgtagaca ggtgtgtggg 60
tataaactgc tgtatctagg ggcaggacca agggggcagg ggcaacagcc ccagcgtgca 120
gggccascat tgcacagtgg astgcaaagg ttgcaggcta tgggcggcta ctavtaaccc 180
cgttttttct gtattatctg taacataata tggtagactg tcacagagcc gaatwccart 240
hacagatga atccaawggg caygaggatg cccasaatca gggcccasat sttcaggcac 300
ttggcggtgg gggcatasgc ctgkgecccg gtcacgtcsc caaccwtcty cctgtcccta 360
cmcttgawtc cncnccttnn nntncctna tntgeccgce cncctcctng ngteaacng 420
natctgcact anctccctcn ccccttntgg antctctcc ttcaantaan uttatccttn 480
acneccccct cncctttccc ctncncncn tnatccengn acncrctca ntentncccc 540
cncntnctn cncatcgttc cncctmtaa ctacncttn nacnancct cactnatncc 600
ngnmanntct tctctccct ccnaegcnn tgcgtgcycc cgtctngcct nnnctncgna 660
cccnacttt atttaacttt ncacctagc nctctacttn acccancnc tctactctcc 720
nggnccaccc nncctnate nctmctctn tcnntctnt cccc 764

<210> 284
<211> 157
<212> DNA
<213> Homo sapien

<400> 284
caagtgtagg cacagtgatg aaagcctgga gcaaacacaa tctgtgggta attaacgttt 60
atttctcccc ttcaggaac gtcttgcatg gatgatcaaa gatcagctc tggtaacat 120
aaataagcta gttaagata cgttccccta cacttga 157

<210> 285
<211> 150
<212> DNA
<213> Homo sapien

<400> 285
attogattgt actcagacaa caatatgcta agtgggaagaa gtcagtcaca aaagaccaca 60
tactgtatga ctacatttac attaatgtgc cagaatagga aaatccgtag agacagaaag 120

tagatgagca gctgcctagg tctgagtaca

150

<210> 286

<211> 219

<212> DNA

<213> Homo sapien

<400> 286

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ataaatgcaa gtctcaccac cagatgtgaa attacagtaa accttgaagg aatctcctga	120
gcaaccttgg ttaggatcaa tccaatatcc accatctggg aagtcaggat ggctgagttg	180
caggtcttta caagttcggg ctggattggg ctgagtaca	219

<210> 287

<211> 196

<212> DNA

<213> Homo sapien

<400> 287

attcgattct tgaggctacc aggagctagg agaagaggca tggaacaaat tttccctcat	60
atccatactc agaaggaacc aacctgctg acaccttaat ttcagettct ggctctaga	120
actgtgagag agtacatttc tcttggttta agccaagaga atctgtcttt tggtaacttta	180
tatcatagcc tcaaga	196

<210> 288

<211> 199

<212> DNA

<213> Homo sapien

<400> 288

attcgatttc agtcagtc cagaacccac attgtcaatt actactctgt araagattca	60
tttgttgaa ttcattggt aaaacattta tgatccctta atatatgcca attaccatgc	120
taggtactga agattcaagt gaccgagatg ctageccctg ggttcaagt atccctctcc	180
cagagtgcac tggactgaa	199

<210> 289

<211> 182

<212> DNA

<213> Homo sapien

<400> 289

attcgattct tgaggctaca aacctgtaca gtatgttact ctactgaata ctgtaggcaa	60
tagtaataca gaagcaagta tctgtatatg taaacattaa aaaggtagag tgaaacttca	120
gtattataat cttagggacc accattatat atgtggtcca tcattggcca aaaaaaaaaa	180
aa	182

<210> 290

<211> 1646

<212> DNA

<213> Homo sapien

<400> 290

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tattgagtga ttgggttatc aaacacccac aaactttaat tttgttaaat ttatatggct	120
ttgaaataga agtataagtt gctaccattt tttgataaca ttgaaagata gtattttacc	180

atctttaatc	atcttggaac	atacaagtc	tgtgaacaac	cactctttca	ccta	jca	240
tgaggccaaa	agtaaaggct	ttaaattata	acatatggga	ttcttagtag	tatgtttttt		300
tcttgaaact	cagtggctct	atctaaccct	actatctcct	cactctttct	ctaagactaa		360
actctaggct	cttaaaaaatc	tgccacaccc	aattcttagaa	gctctgaaaa	gaatttgcct		420
ttaaatatct	tttaaatagta	acatgtattt	tatggacca	attgacattt	tcgactattt		480
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gcagtctcct	taaaggtaga	acaaataact	tctatttttt	tttcaccatt	gtgggattgg		660
actttaagag	gtgactctaa	aaaaacagag	aacaaatgtg	tctcagttgt	attaagcacg		720
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gagcagaagc	aaaccacatg	tctcagctat	attattattt	attttttatg	cataaagtga		1020
atcatttctt	ctgtattaat	ttccaaaggg	ttttaccctc	tatttaaatg	ctttgaaaaa		1080
cagtgcattg	acaatgggtt	gatatttttc	tttaaaagaa	aaatataatt	atgaaagcca		1140
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kgcactactac	atgcagttct	tttaaccaatg	tctgtttggc	taatgtaatt	aaagttgtta		1320
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ctggtaattt	ttttatttac	aatatgttta	aagagataac	agtttgatat	gttttcatgt		1440
gtttatagca	gaagttattt	atttctatgg	cattccagcg	gatattttgg	tgtttgcgag		1500
gcatgcagtc	aatattttgt	acagtttagt	gacagtattc	agcaacgcct	gatagcttct		1560
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aaaaaaaaaa	aaaaaaaaaa	aaaaaa					1646

<210> 291

<211> 1851

<212> DNA

<213> Homo sapien

<400> 291

tcateccat	tgccagcagc	ggcaccgtta	gtcagggttt	ctgggaatcc	cacatgagta	60
cttccgtgtt	cttcattctt	cttcaatagc	cataaatctt	ctagctctgg	ctggctgttt	120
tcacttcctt	taagcctttg	tgactcttcc	tctgatgtca	gctttaagtc	ttgttctgga	180
ttgctgtttt	cagaagagat	ttttaacatc	tgtttttctt	tgtagtcaga	aagtaactgg	240
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ggccatgctt	gttttttgat	tcgatatcag	caccgtataa	gagcagtgct	ttggccatta	540
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ttggatcagt	gccatgttcc	agcaacatta	acgcacattc	atcttctctg	cattgtacgg	660
cctttgtcag	agctgtcttc	tttttgttgt	caaggacatt	aagttgacat	cgtctgtcca	720
gcacgagttt	tactacttct	gaattcccat	tggcagaggc	cagatgtaga	gcagtcctct	780
tttgettgtc	cctcttgttc	acatccgtgt	ccctgagcat	gacgatgaga	tcctttctgg	840
ggactttacc	ccaccaggca	gctctgtgga	gettgtccag	atcttctcca	tggacgtggt	900
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cgtccccctg	cagcagggga	agcagtggca	gcaccacttg	cacctcttgc	tcccaagcgt	1020
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acagaggatg	agatccagaa	accacaatat	ccattcacaa	acaaacactt	ttcagccaga	1260
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aatataattc	tcctctggag	ccatatggat	gaactatgaa	ggaagaactc	cccgaagaag	1440
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tgtgtttctt	ccccagtgat	gcagcctcaa	gttatcccga	agctgccgca	gcacacgggtg	1560
gctcctgaga	aacaccccag	ctcttcgggt	ctaacacagg	caagtcaata	aatgtgataa	1620
tcacataaac	agaattaaaa	gcaaagtcac	ataagcatct	caacagacac	agaaaaggca	1680
tttgacaaaa	tccagcatcc	ttgtatttat	tggtgcagtt	ctcagaggaa	atgcttctaa	1740
cttttcccca	tttagtatta	tggtggctgt	gggcttgtea	taggtgggtt	ttattacttt	1800
aaggtatgtc	ccttctatgc	ctgttttgct	gagggtttta	attctcgtgc	c	1851

<210> 292

<211> 1851

<212> DNA

<213> Homo sapien

<400> 292

tcatacccat	tgccagcagc	ggcaccggtta	gtcagggtttt	ctgggaatcc	cacatgagta	60
cttcctgtgt	cttcattctt	cttcaatagc	cataaatctt	ctagctctgg	ctggctgttt	120
tcacttcctt	taagcctttg	tgactcttcc	tctgatgtca	gctttaagtc	ttgttctgga	180
ttgctgtttt	cagaagagat	ttttaacatc	tggttttctt	tgtagtcaga	aagtaactgg	240
caaattacat	gatgatgact	agaaacagca	tactctctgg	cgtcttttcc	agatcttgag	300
aagatacatc	aacattttgc	tcaagtagag	ggctgactat	acttgctgat	ccacaacata	360
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tgattaaaaa	tttcaccact	tgctgttttt	gctcatgtat	accaagtagc	agtgggtgta	480
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<210> 293

<211> 668

<212> DNA

<213> Homo sapien

<400> 293

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accrtataag	agcagtgett	tggccattaa	tttatcttcc	attttagaca	gcrtagtgya	180
gagtggtatt	tcataactca	tctggaatat	ttggatcagt	gccatgttcc	agcaacatta	240
acgcacattc	atcttcctgg	cattgtacgg	cctgtcagta	ttagacccaa	aaacaaatta	300
catatcttag	gaattcaaaa	taacattcca	cagctttcac	caactagtta	tatttaaagg	360
agaaaaactca	tttttatgcc	atgtattgaa	atcaaaccca	cctcatgctg	atatagttgg	420
ctactgcata	cctttatcag	agctgtcctc	tttttgttgt	caaggacatt	aagttgacat	480
cgtctgtcca	gcaggagttt	tactacttct	gaattcccat	tggcagaggc	cagatgtaga	540
gcagtcctat	gagagtgaga	agacttttta	ggaaattgta	gtgcactagc	tacagccata	600
gcaatgattc	atgtaactgc	aaacactgaa	tagcctgcta	ttactctgcc	ttcaaaaaaa	660
aaaaaaaa						668

<210> 294

<211> 1512

<212> DNA

<213> Homo sapien

<400> 294

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tgggtctggc	trgaatcccc	tgctgggggt	ggcaggtttt	ggctgggatt	gacttttytc	120
ttcaaacaga	ttggaaaccc	ggagttacct	gctagtgggt	gaaactgggt	ggtagacgcg	180
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tccatgcggg	ctgcttcttc	tgtgaagaag	ccatttgggc	tcaggagcaa	gatgggcaag	300
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cactgcttcc	cctgctgcag	ggggagtggc	aagagcaacg	tgggcgcttc	tggagaccac	480
gacgagtctg	ctatgaagac	actnaggaa	aagtgggcca	agtgggtgct	ccactgcttc	540
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gccttcattg	agcccaggtg	ccacgtccgt	ggagaagatc	tggacaagct	ccacagagct	660
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<210> 295

<211> 1853

<212> DNA

<213> Homo sapien

<400> 295

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<210> 296

<211> 2184

<212> DNA

<213> Homo sapien

<400> 296

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<210> 297

<211> 1855

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

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<400> 297

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<210> 298

<211> 1059

<212> DNA

<213> Homo sapien

<400> 298

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<210> 299

<211> 329

<212> PRT

<213> Homo sapien

<400> 299

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Glu Tyr Thr Ile Val His Ala Ser Phe Ile Ser Cys Ile Ser Ser Ser
35     40     45
Leu Asp Gly Gln Gly Glu Arg Gln Glu Gln Arg Gly His Phe Trp Arg
50     55     60
Pro Gln Arg Leu Leu Cys Glu Asp Ala Trp Glu Gln Glu Val Gln Val
65     70     75     80
Val Leu Pro Leu Leu Pro Leu Leu Gln Gly Ser Gly Lys Ser Asn Val
85     90     95
Val Ala Trp Gly Asp Tyr Asp Asp Ser Ala Phe Met Asp Pro Arg Tyr
100    105    110
His Val His Gly Glu Asp Leu Asp Lys Leu His Arg Ala Ala Trp Trp
115    120    125
Gly Lys Val Pro Arg Lys Asp Leu Ile Val Met Leu Arg Asp Thr Asp
130    135    140
Val Asn Lys Arg Asp Lys Gln Lys Arg Thr Ala Leu His Leu Ala Ser

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145 150 155 160
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 Gln Leu Asn Val Leu Asp Asn Lys Lys Arg Thr Ala Leu Thr Lys Ala
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 Val Gln Cys Gln Glu Asp Glu Cys Ala Leu Met Leu Leu Glu His Gly
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 Thr Asp Pro Asn Ile Pro Asp Glu Tyr Gly Asn Thr Thr Leu His Tyr
 210 215 220
 Ala Val Tyr Asn Glu Asp Lys Leu Met Ala Lys Ala Leu Leu Leu Tyr
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 260 265 270
 Lys Lys Ala Asn Leu Asn Ala Leu Asp Arg Tyr Gly Arg Thr Ala Leu
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<210> 300

<211> 148

<212> PRT

<213> Homo sapien

<220>

<221> VARIANT

<222> (1)...(148)

<223> Xaa = Any Amino Acid

<400> 300

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 35 40 45
 Gln Lys Arg Thr Ala Leu His Leu Ala Ser Ala Asn Gly Asn Ser Glu
 50 55 60
 Val Val Lys Leu Xaa Leu Asp Arg Arg Cys Gln Leu Asn Val Leu Asp
 65 70 75 80
 Asn Lys Lys Arg Thr Ala Leu Xaa Lys Ala Val Gln Cys Gln Glu Asp
 85 90 95
 Glu Cys Ala Leu Met Leu Leu Glu His Gly Thr Asp Pro Asn Ile Pro
 100 105 110
 Asp Glu Tyr Gly Asn Thr Thr Leu His Tyr Ala Xaa Tyr Asn Glu Asp
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<210> 301
<211> 1155
<212> DNA
<213> Homo sapien

<400> 301

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<212> DNA
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<400> 302

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cttagttgta	agaaagaaaa	agacatcttg	catgaaaata	gtacgttgcg	ggaagaaatt	1920
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<210> 303

<211> 2040

<212> DNA

<213> Homo sapien

<400> 303

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<210> 304

<211> 384

<212> PRT

<213> Homo sapien

<400> 304

Met	Val	Val	Glu	Val	Asp	Ser	Met	Pro	Ala	Ala	Ser	Ser	Val	Lys	Lys	1	5	10	15
Pro	Phe	Gly	Leu	Arg	Ser	Lys	Met	Gly	Lys	Trp	Cys	Cys	Arg	Cys	Phe	20	25	30	
Pro	Cys	Cys	Arg	Glu	Ser	Gly	Lys	Ser	Asn	Val	Gly	Thr	Ser	Gly	Asp	35	40	45	
His	Asp	Asp	Ser	Ala	Met	Lys	Thr	Leu	Arg	Ser	Lys	Met	Gly	Lys	Trp	50	55	60	
Cys	Arg	His	Cys	Phe	Pro	Cys	Cys	Arg	Gly	Ser	Gly	Lys	Ser	Asn	Val	65	70	75	80
Gly	Ala	Ser	Gly	Asp	His	Asp	Asp	Ser	Ala	Met	Lys	Thr	Leu	Arg	Asn	85	90	95	
Lys	Met	Gly	Lys	Trp	Cys	Cys	His	Cys	Phe	Pro	Cys	Cys	Arg	Gly	Ser	100	105	110	
Gly	Lys	Ser	Lys	Val	Gly	Ala	Trp	Gly	Asp	Tyr	Asp	Asp	Ser	Ala	Phe	115	120	125	
Met	Glu	Pro	Arg	Tyr	His	Val	Arg	Gly	Glu	Asp	Leu	Asp	Lys	Leu	His	130	135	140	
Arg	Ala	Ala	Trp	Trp	Gly	Lys	Val	Pro	Arg	Lys	Asp	Leu	Ile	Val	Met	145	150	155	160
Leu	Arg	Asp	Thr	Asp	Val	Asn	Lys	Lys	Asp	Lys	Gln	Lys	Arg	Thr	Ala	165	170	175	
Leu	His	Leu	Ala	Ser	Ala	Asn	Gly	Asn	Ser	Glu	Val	Val	Lys	Leu	Leu	180	185	190	
Leu	Asp	Arg	Arg	Cys	Gln	Leu	Asn	Val	Leu	Asp	Asn	Lys	Lys	Arg	Thr	195	200	205	
Ala	Leu	Ile	Lys	Ala	Val	Gln	Cys	Gln	Glu	Asp	Glu	Cys	Ala	Leu	Met	210	215	220	
Leu	Leu	Glu	His	Gly	Thr	Asp	Pro	Asn	Ile	Pro	Asp	Glu	Tyr	Gly	Asn	225	230	235	240
Thr	Thr	Leu	His	Tyr	Ala	Ile	Tyr	Asn	Glu	Asp	Lys	Leu	Met	Ala	Lys	245	250	255	
Ala	Leu	Leu	Leu	Tyr	Gly	Ala	Asp	Ile	Glu	Ser	Lys	Asn	Lys	His	Gly	260	265	270	
Leu	Thr	Pro	Leu	Leu	Leu	Gly	Val	His	Glu	Gln	Lys	Gln	Gln	Val	Val	275	280	285	
Lys	Phe	Leu	Ile	Lys	Lys	Lys	Ala	Asn	Leu	Asn	Ala	Leu	Asp	Arg	Tyr	290	295	300	
Gly	Arg	Thr	Ala	Leu	Ile	Leu	Ala	Val	Cys	Cys	Gly	Ser	Ala	Ser	Ile	305	310	315	320
Val	Ser	Leu	Leu	Leu	Glu	Gln	Asn	Ile	Asp	Val	Ser	Ser	Gln	Asp	Leu	325	330	335	
Ser	Gly	Gln	Thr	Ala	Arg	Glu	Tyr	Ala	Val	Ser	Ser	His	His	His	Val	340	345	350	
Ile	Cys	Gln	Leu	Leu	Ser	Asp	Tyr	Lys	Glu	Lys	Gln	Met	Leu	Lys	Ile	355	360	365	
Ser	Ser	Glu	Asn	Ser	Asn	Pro	Glu	Asn	Val	Ser	Arg	Thr	Arg	Asn	Lys	370	375	380	

<210> 305
 <211> 656
 <212> PRT
 <213> Homo sapien

<400> 305

Met	Val	Val	Glu	Val	Asp	Ser	Met	Pro	Ala	Ala	Ser	Ser	Val	Lys	Lys
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			20					25					30		
Pro	Cys	Cys	Arg	Glu	Ser	Gly	Lys	Ser	Asn	Val	Gly	Thr	Ser	Gly	Asp
		35					40					45			
His	Asp	Asp	Ser	Ala	Met	Lys	Thr	Leu	Arg	Ser	Lys	Met	Gly	Lys	Trp
	50					55					60				
Cys	Arg	His	Cys	Phe	Pro	Cys	Cys	Arg	Gly	Ser	Gly	Lys	Ser	Asn	Val
65					70				75					80	
Gly	Ala	Ser	Gly	Asp	His	Asp	Asp	Ser	Ala	Met	Lys	Thr	Leu	Arg	Asn
				85					90					95	
Lys	Met	Gly	Lys	Trp	Cys	Cys	His	Cys	Phe	Pro	Cys	Cys	Arg	Gly	Ser
			100					105					110		
Gly	Lys	Ser	Lys	Val	Gly	Ala	Trp	Gly	Asp	Tyr	Asp	Asp	Ser	Ala	Phe
		115					120					125			
Met	Glu	Pro	Arg	Tyr	His	Val	Arg	Gly	Glu	Asp	Leu	Asp	Lys	Leu	His
	130					135					140				
Arg	Ala	Ala	Trp	Trp	Gly	Lys	Val	Pro	Arg	Lys	Asp	Leu	Ile	Val	Met
145					150					155				160	
Leu	Arg	Asp	Thr	Asp	Val	Asn	Lys	Lys	Asp	Lys	Gln	Lys	Arg	Thr	Ala
				165					170					175	
Leu	His	Leu	Ala	Ser	Ala	Asn	Gly	Asn	Ser	Glu	Val	Val	Lys	Leu	Leu
		180					185						190		
Leu	Asp	Arg	Arg	Cys	Gln	Leu	Asn	Val	Leu	Asp	Asn	Lys	Lys	Arg	Thr
	195						200					205			
Ala	Leu	Ile	Lys	Ala	Val	Gln	Cys	Gln	Glu	Asp	Glu	Cys	Ala	Leu	Met
	210					215					220				
Leu	Leu	Glu	His	Gly	Thr	Asp	Pro	Asn	Ile	Pro	Asp	Glu	Tyr	Gly	Asn
225					230						235			240	
Thr	Thr	Leu	His	Tyr	Ala	Ile	Tyr	Asn	Glu	Asp	Lys	Leu	Met	Ala	Lys
				245					250					255	
Ala	Leu	Leu	Leu	Tyr	Gly	Ala	Asp	Ile	Glu	Ser	Lys	Asn	Lys	His	Gly
		260					265						270		
Leu	Thr	Pro	Leu	Leu	Leu	Gly	Val	His	Glu	Gln	Lys	Gln	Gln	Val	Val
	275						280					285			
Lys	Phe	Leu	Ile	Lys	Lys	Lys	Ala	Asn	Leu	Asn	Ala	Leu	Asp	Arg	Tyr
	290					295					300				
Gly	Arg	Thr	Ala	Leu	Ile	Leu	Ala	Val	Cys	Cys	Gly	Ser	Ala	Ser	Ile
305					310					315				320	
Val	Ser	Leu	Leu	Leu	Glu	Gln	Asn	Ile	Asp	Val	Ser	Ser	Gln	Asp	Leu
				325					330					335	
Ser	Gly	Gln	Thr	Ala	Arg	Glu	Tyr	Ala	Val	Ser	Ser	His	His	His	Val
			340					345					350		
Ile	Cys	Gln	Leu	Leu	Ser	Asp	Tyr	Lys	Glu	Lys	Gln	Met	Leu	Lys	Ile
	355						360					365			
Ser	Ser	Glu	Asn	Ser	Asn	Pro	Glu	Gln	Asp	Leu	Lys	Leu	Thr	Ser	Glu
	370					375					380				
Glu	Glu	Ser	Gln	Arg	Phe	Lys	Gly	Ser	Glu	Asn	Ser	Gln	Pro	Glu	Lys

385 390 395 400
Met Ser Gln Glu Pro Glu Ile Asn Lys Asp Gly Asp Arg Glu Val Glu
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Glu Glu Met Lys Lys His Glu Ser Asn Asn Val Gly Leu Leu Glu Asn
420 425 430
Leu Thr Asn Gly Val Thr Ala Gly Asn Gly Asp Asn Gly Leu Ile Pro
435 440 445
Gln Arg Lys Ser Arg Thr Pro Glu Asn Gln Gln Phe Pro Asp Asn Glu
450 455 460
Ser Glu Glu Tyr His Arg Ile Cys Glu Leu Val Ser Asp Tyr Lys Glu
465 470 475 480
Lys Gln Met Pro Lys Tyr Ser Ser Glu Asn Ser Asn Pro Glu Gln Asp
485 490 495
Leu Lys Leu Thr Ser Glu Glu Glu Ser Gln Arg Leu Glu Gly Ser Glu
500 505 510
Asn Gly Gln Pro Glu Leu Glu Asn Phe Met Ala Ile Glu Glu Met Lys
515 520 525
Lys His Gly Ser Thr His Val Gly Phe Pro Glu Asn Leu Thr Asn Gly
530 535 540
Ala Thr Ala Gly Asn Gly Asp Asp Gly Leu Ile Pro Pro Arg Lys Ser
545 550 555 560
Arg Thr Pro Glu Ser Gln Gln Phe Pro Asp Thr Glu Asn Glu Glu Tyr
565 570 575
His Ser Asp Glu Gln Asn Asp Thr Gln Lys Gln Phe Cys Glu Glu Gln
580 585 590
Asn Thr Gly Ile Leu His Asp Glu Ile Leu Ile His Glu Glu Lys Gln
595 600 605
Ile Glu Val Val Glu Lys Met Asn Ser Glu Leu Ser Leu Ser Cys Lys
610 615 620
Lys Glu Lys Asp Ile Leu His Glu Asn Ser Thr Leu Arg Glu Glu Ile
625 630 635 640
Ala Met Leu Arg Leu Glu Leu Asp Thr Met Lys His Gln Ser Gln Leu
645 650 655

<210> 306
<211> 671
<212> PRT
<213> Homo sapien

<400> 306
Met Val Val Glu Val Asp Ser Met Pro Ala Ala Ser Ser Val Lys Lys
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Pro Phe Gly Leu Arg Ser Lys Met Gly Lys Trp Cys Cys Arg Cys Phe
20 25 30
Pro Cys Cys Arg Glu Ser Gly Lys Ser Asn Val Gly Thr Ser Gly Asp
35 40 45
His Asp Asp Ser Ala Met Lys Thr Leu Arg Ser Lys Met Gly Lys Trp
50 55 60
Cys Arg His Cys Phe Pro Cys Cys Arg Gly Ser Gly Lys Ser Asn Val
65 70 75 80
Gly Ala Ser Gly Asp His Asp Asp Ser Ala Met Lys Thr Leu Arg Asn
85 90 95
Lys Met Gly Lys Trp Cys Cys His Cys Phe Pro Cys Cys Arg Gly Ser
100 105 110
Gly Lys Ser Lys Val Gly Ala Trp Gly Asp Tyr Asp Asp Ser Ala Phe

115	120	125
Met Glu Pro Arg Tyr His Val Arg Gly Glu Asp Leu Asp Lys Leu His		
130	135	140
Arg Ala Ala Trp Trp Gly Lys Val Pro Arg Lys Asp Leu Ile Val Met		
145	150	155
Leu Arg Asp Thr Asp Val Asn Lys Lys Asp Lys Gln Lys Arg Thr Ala		
165	170	175
Leu His Leu Ala Ser Ala Asn Gly Asn Ser Glu Val Val Lys Leu Leu		
180	185	190
Leu Asp Arg Arg Cys Gln Leu Asn Val Leu Asp Asn Lys Lys Arg Thr		
195	200	205
Ala Leu Ile Lys Ala Val Gln Cys Gln Glu Asp Glu Cys Ala Leu Met		
210	215	220
Leu Leu Glu His Gly Thr Asp Pro Asn Ile Pro Asp Glu Tyr Gly Asn		
225	230	235
Thr Thr Leu His Tyr Ala Ile Tyr Asn Glu Asp Lys Leu Met Ala Lys		
245	250	255
Ala Leu Leu Leu Tyr Gly Ala Asp Ile Glu Ser Lys Asn Lys His Gly		
260	265	270
Leu Thr Pro Leu Leu Leu Gly Val His Glu Gln Lys Gln Gln Val Val		
275	280	285
Lys Phe Leu Ile Lys Lys Lys Ala Asn Leu Asn Ala Leu Asp Arg Tyr		
290	295	300
Gly Arg Thr Ala Leu Ile Leu Ala Val Cys Cys Gly Ser Ala Ser Ile		
305	310	315
Val Ser Leu Leu Leu Glu Gln Asn Ile Asp Val Ser Ser Gln Asp Leu		
325	330	335
Ser Gly Gln Thr Ala Arg Glu Tyr Ala Val Ser Ser His His His Val		
340	345	350
Ile Cys Gln Leu Leu Ser Asp Tyr Lys Glu Lys Gln Met Leu Lys Ile		
355	360	365
Ser Ser Glu Asn Ser Asn Pro Glu Gln Asp Leu Lys Leu Thr Ser Glu		
370	375	380
Glu Glu Ser Gln Arg Phe Lys Gly Ser Glu Asn Ser Gln Pro Glu Lys		
385	390	395
Met Ser Gln Glu Pro Glu Ile Asn Lys Asp Gly Asp Arg Glu Val Glu		
405	410	415
Glu Glu Met Lys Lys His Glu Ser Asn Asn Val Gly Leu Leu Glu Asn		
420	425	430
Leu Thr Asn Gly Val Thr Ala Gly Asn Gly Asp Asn Gly Leu Ile Pro		
435	440	445
Gln Arg Lys Ser Arg Thr Pro Glu Asn Gln Gln Phe Pro Asp Asn Glu		
450	455	460
Ser Glu Glu Tyr His Arg Ile Cys Glu Leu Val Ser Asp Tyr Lys Glu		
465	470	475
Lys Gln Met Pro Lys Tyr Ser Ser Glu Asn Ser Asn Pro Glu Gln Asp		
485	490	495
Leu Lys Leu Thr Ser Glu Glu Glu Ser Gln Arg Leu Glu Gly Ser Glu		
500	505	510
Asn Gly Gln Pro Glu Lys Arg Ser Gln Glu Pro Glu Ile Asn Lys Asp		
515	520	525
Gly Asp Arg Glu Leu Glu Asn Phe Met Ala Ile Glu Glu Met Lys Lys		
530	535	540
His Gly Ser Thr His Val Gly Phe Pro Glu Asn Leu Thr Asn Gly Ala		
545	550	555
		560

Thr Ala Gly Asn Gly Asp Asp Gly Leu Ile Pro Pro Arg Lys Ser Arg
 565 570 575
 Thr Pro Glu Ser Gln Gln Phe Pro Asp Thr Glu Asn Glu Glu Tyr His
 580 585 590
 Ser Asp Glu Gln Asn Asp Thr Gln Lys Gln Phe Cys Glu Glu Gln Asn
 595 600 605
 Thr Gly Ile Leu His Asp Glu Ile Leu Ile His Glu Glu Lys Gln Ile
 610 615 620
 Glu Val Val Glu Lys Met Asn Ser Glu Leu Ser Leu Ser Cys Lys Lys
 625 630 635 640
 Glu Lys Asp Ile Leu His Glu Asn Ser Thr Leu Arg Glu Glu Ile Ala
 645 650 655
 Met Leu Arg Leu Glu Leu Asp Thr Met Lys His Gln Ser Gln Leu
 660 665 670

<210> 307
 <211> 800
 <212> DNA
 <213> Homo sapien

<400> 307
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 agaatgctta ggactctaac aggtttttga gaatgtgttg gtaagggcca ctcaatccaa 180
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 ctagtgtttc tgttgtgttg tcagttagca caactattcc gatcagcagg gtccaggagc 360
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 ggcttggccc caacattctc tctctgatgg ggaataatgg ccacctgagg gaagtacaga 600
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<210> 308
 <211> 102
 <212> PRT
 <213> Homo sapien

<220>
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 <223> Xaa = Any Amino Acid

<400> 308
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 20 25 30
 Thr Leu Glu Lys Glu Val Ala His Phe Phe Cys Thr Met Ala Trp Pro
 35 40 45
 Gln His Ser Leu Ser Asp Gly Glu Lys Trp Pro Pro Glu Gly Ser Thr
 50 55 60

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<210> 315

<211> 293

<212> PRT

<213> Homo sapiens

<400> 315

Met His Leu Ser Phe Pro Ala Phe Leu Pro Pro Trp Met Asp Arg Gly
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20 25 30

Val Lys Thr Leu Gly Ser Lys Arg Cys Lys Trp Cys Cys His Cys Phe
35 40 45

Pro Cys Cys Arg Gly Ser Gly Lys Ser Asn Val Val Ala Trp Gly Asp
50 55 60

Tyr Asp Asp Ser Ala Phe Met Asp Pro Arg Tyr His Val His Gly Glu
65 70 75 80

Asp Leu Asp Lys Leu His Arg Ala Ala Trp Trp Gly Lys Val Pro Arg
85 90 95

Lys Asp Leu Ile Val Met Leu Arg Asp Thr Asp Val Asn Lys Arg Asp
100 105 110

Lys Gln Lys Arg Thr Ala Leu His Leu Ala Ser Ala Asn Gly Asn Ser
115 120 125

Glu Val Val Lys Leu Val Leu Asp Arg Arg Cys Gln Leu Asn Val Leu
130 135 140

Asp Asn Lys Lys Arg Thr Ala Leu Thr Lys Ala Val Gln Cys Gln Glu
145 150 155 160

Asp Glu Cys Ala Leu Met Leu Leu Glu His Gly Thr Asp Pro Asn Ile
165 170 175

Pro Asp Glu Tyr Gly Asn Thr Thr Leu His Tyr Ala Val Tyr Asn Glu
180 185 190

Asp Lys Leu Met Ala Lys Ala Leu Leu Leu Tyr Gly Ala Asp Ile Glu
195 200 205

Ser Lys Asn Lys His Gly Leu Thr Pro Leu Leu Leu Gly Ile His Glu
210 215 220

Gln Lys Gln Gln Val Val Lys Phe Leu Ile Lys Lys Lys Ala Asn Leu
225 230 235 240

Asn Ala Leu Asp Arg Tyr Gly Arg Thr Ala Leu Ile Leu Ala Val Cys
245 250 255

Cys Gly Ser Ala Ser Ile Val Ser Pro Leu Leu Glu Gln Asn Val Asp
260 265 270

Val Ser Ser Gln Asp Leu Glu Arg Arg Pro Glu Ser Met Leu Phe Leu
275 280 285

Val Ile Ile Met
290

<210> 316

<211> 584

<212> DNA

<213> Homo sapiens

<400> 316

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gaggcttata actaatagga aggggagcta tagggaggct aggatatggg ggtaagctga 180
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<210> 317

<211> 829

<212> DNA

<213> Homo sapiens

<400> 317

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agaatgctta ggactetaac aggtttttga gaatgtgttg gtaagggcca ctcaatccaa 180
tttttcttgg tcctccttgt ggtctaggag gacaggcaag ggtgcagatt ttcaagaatg 240
catcagtaag ggccactaaa tccgaccttc ctctgtcttc cttgttgtct gggaggaaaa 300
ctagtgtttc tgttgctgtg tcagtgcaga caactattcc gatcagcagg gtccagggac 360
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ggcttggtccc caacattctc tctctgatgg ggaaaaatgg ccacctgagg gaagtacaga 600
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accttatgtc caagctttct tttcattgaa ggagaataca ctatgcaaag cttgaaat 720
acatcccaca ggaggacctc ttagcttacc cccatatact agcctcccta tagctccctc 780
tctattagt gataagctc ctctaatac cccacccag aagaaaata 829
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THE UNITED STATES OF AMERICA

DEPARTMENT OF THE ARMY
OFFICE OF THE ADJUTANT GENERAL



WASHINGTON, D. C. 20315

MEMORANDUM FOR THE RECORD

171

DATE: 10/10/68

SUBJECT: [Illegible]

1. [Illegible]

2. [Illegible]

2. [Illegible]

3. [Illegible]

3. [Illegible]

4. [Illegible]

4. [Illegible]

5. [Illegible]

5. [Illegible]

6. [Illegible]

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ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS,
LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ,
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GA, GN, GW, ML, MR, NE, SN, TD, TG).

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Published:

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For two-letter codes and other abbreviations, refer to the "Guid-
ance Notes on Codes and Abbreviations" appearing at the begin-
ning of each regular issue of the PCT Gazette.

(54) Title: COMPOSITIONS AND METHODS FOR THE TREATMENT AND DIAGNOSIS OF BREAST CANCER



cDNA PREPARED FROM
NORMAL BREAST TISSUE
FROM THE SAME PATIENT

cDNA PREPARED
FROM BREAST TUMOR

B18Ag1

(57) Abstract: Compositions and methods for the detection and therapy of breast cancer are disclosed. The compounds provided include nucleotide sequences that are preferentially expressed in breast tumor tissue, as well as polypeptides encoded by such nucleotide sequences. Vaccines and pharmaceutical compositions comprising such compounds are also provided and may be used, for example, for the prevention and treatment of breast cancer. The polypeptides may also be used for the production of antibodies, which are useful for diagnosing and monitoring the progression of breast cancer in a patient.

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C12N15/12 C07K14/47 C07K16/18 C07K19/00 C12N15/62
 A61K38/17 A61K39/395 A61K48/00 C12N5/08 G01N33/574
 C12Q1/68

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C12N C07K A61K G01N C12Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 98 45328 A (CORIXA CORPORATION) 15 October 1998 (1998-10-15) page 2, line 7 -page 5, line 22 page 7, line 23 -page 24, line 11; examples 1-4 sequence listing SEQ ID NOs:1, 3-10, 227 ---	1,2,4-60
X	WO 97 25426 A (CORIXA CORPORATION) 17 July 1997 (1997-07-17) page 2, line 8 -page 5, line 11 page 7, line 14 -page 23, line 2; example 1 sequence listing SEQ ID NO:1, 3-10, 227 --- -/-	1,2,4-60

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

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 "E" earlier document but published on or after the international filing date
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"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
 "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
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 "&" document member of the same patent family

Date of the actual completion of the international search

8 August 2000

Date of mailing of the international search report

08.11.00

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
 NL - 2280 HV Rijswijk
 Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
 Fax: (+31-70) 340-3016

Authorized officer

MONTERO LOPEZ B.

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>WO 97 25431 A (CORIXA CORPORATION) 17 July 1997 (1997-07-17) page 2, line 3 -page 3, line 25 page 4, line 12 -page 17, line 18; examples 1-4 sequence listing SEQ ID NOs:1, 3-10</p> <p>-----</p>	1,2,4-10

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☒ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
Although claims 21, 22, 29-31 34 37-39 are directed to a method of treatment of the human/animal body, the search has been carried out and based on the alleged effects of the compound/composition.
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this International application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Claims 1, 2, 4-60 Partially.

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: Partially 1, 2, 4-60

Breast cancer related polypeptide B18Ag1, corresponding polynucleotides comprising SEQ ID NOs:1, 3-10, or 227, and derived oligonucleotides; variants thereof, expression vector and host cell comprising the same; antibody and diagnostic kit containing it, fusion protein comprising the polypeptide; pharmaceutical composition and vaccine comprising any of the above and use therefor in the treatment of cancer, and for removing tumor cells from a sample; use of the polypeptides for stimulating and expanding T-cells and use of such T-cells for inhibiting cancer development; use of the polypeptides for determining the presence of cancer or monitoring the progression of cancer in a patient.

2. Claims: Partially 1-60

Idem as subject 1 for Breast cancer related polypeptide and polynucleotide B21GT2 (B311D) comprising SEQ ID NOs:56, 307, 308, 316 or 317.

3. Claims: Partially 1, 2, 4-60

Idem as subject 1 for Breast cancer related polypeptide and polynucleotide B15Ag1 comprising SEQ ID NOs:27 or 290.

4. Claims: Partially 1, 2, 4-60

Idem as subject 1 for Breast cancer related polypeptide and polynucleotide B31GA1b comprising SEQ ID NOs:148.

5. Claims: Partially 1, 2, 4-60

Idem as subject 1 for Breast cancer related polypeptide and polynucleotide B38GA2a comprising SEQ ID NOs:157.

6. Claims: Partially 1-60

Idem as subject 1 for Breast cancer related polypeptide and polynucleotide B11Ag1 (B305D) and its isoform A comprising SEQ ID NO:292-306, or 309-315.

7. Claims: Claims: Partially 1, 2, 4-60,
all as far as applicable

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Breast cancer related polypeptides, corresponding polynucleotides comprising SEQ ID NOs:11-26 (inventions 7-22), 28-55 (inventions 23-50), 57-86 (inventions 51-80), 142-147 (inventions 81-86), 149-156 (inventions 87-94), 158-226 (inventions 95-163), 228-253 (inventions 164-189), or 255-291 (inventions 190-226), and derived oligonucleotides; variants thereof, expression vector and host cell comprising the same; antibody and diagnostic kit containing it, fusion protein comprising the polypeptide; pharmaceutical composition and vaccine comprising any of the above and use therefor in the treatment of cancer, and for removing tumor cells from a sample; use of the polypeptides for stimulating and expanding T-cells and use of such T-cells for inhibiting cancer development; use of the polypeptides for inhibiting or monitoring the progression of cancer in a patient, as far as applicable.

INTERNATIONAL SEARCH REPORT

Information on patent family members

Int. l. Application No

PCT/US 00/09312

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9845328 A	15-10-1998	AU 6956098 A EP 0975666 A NO 994932 A PL 336349 A ZA 9802968 A	30-10-1998 02-02-2000 07-12-1999 19-06-2000 27-10-1998
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WO 9725431 A	17-07-1997	AU 1575697 A	01-08-1997

PCT

INVITATION TO PAY ADDITIONAL FEES

(PCT Article 17(3)(a) and Rule 40.1)

To:

SEED INTELLECTUAL PROPERTY LAW
GROUP PLLCAttn. Potter, Jane E.
Suite 6300701 Fifth Avenue
Seattle, WA 98104-7092

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International application No.

PCT/US 01/ 16776

International filing date
(day/month/year)

22/05/2001

Applicant

CORIXA CORPORATION

1. This International Searching Authority

- (i) considers that there are
- 255
- (number of) inventions claimed in the international application covered by the claims indicated
- ~~XXXX~~
- on the extra sheet:

and it considers that the international application does not comply with the requirements of unity of invention (Rules 13.1, 13.2 and 13.3) for the reasons indicated ~~XXXX~~ on the extra sheet:

- (ii)
- ☒
- has carried out a partial international search (see Annex)
- ☐
- will establish the international search report on those parts of the international application which relate to the invention first mentioned in claims Nos.:

1-17 partially

- (iii) will establish the international search report on the other parts of the international application only if, and to the extent to which, additional fees are paid

2. The applicant is hereby invited, within the time limit indicated above, to pay the amount indicated below:

EUR 945,00	x	254	=	EUR 240.030,00
Fee per additional invention		number of additional inventions		total amount of additional fees

Or, _____ x _____ = _____

The applicant is informed that, according to Rule 40.2(c), the payment of any additional fee may be made under protest, i.e., a reasoned statement to the effect that the international application complies with the requirement of unity of invention or that the amount of the required additional fee is excessive.

- 3.
- ☒
- Claim(s) Nos.
- further info
- have been found to be unsearchable under Article 17(2)(b) because of defects under Article 17(2)(a) and therefore have not been included with any invention.

Name and mailing address of the International Searching Authority

European Patent Office, P.B. 5818 Patentlaan 2
NL-2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Henriëtte Huysing-Solles

1. The present communication is an Annex to the invitation to pay additional fees (Form PCT/ISA/206). It shows the results of the international search established on the parts of the international application which relate to the invention first mentioned in claims Nos.:

see 'Invitation to pay additional fees'

2. This communication is not the international search report which will be established according to Article 18 and Rule 43.

3. If the applicant does not pay any additional search fees, the information appearing in this communication will be considered as the result of the international search and will be included as such in the international search report.

4. If the applicant pays additional fees, the international search report will contain both the information appearing in this communication and the results of the international search on other parts of the international application for which such fees will have been paid.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 97 25431 A (CORIXA CORP) 17 July 1997 (1997-07-17) see SEQ ID NO: the whole document ---	1-17
X	WO 97 25426 A (CORIXA CORP) 17 July 1997 (1997-07-17) see SEQ ID NO: 1 and 2 (pp. 34-37) page 1 -page 23; claims 1-42; figures 1,4,6; examples 1-4 ---	1-17
X	WO 98 45328 A (CORIXA CORP) 15 October 1998 (1998-10-15) see SEQ ID NO: 1 and 2 (pp. 34-36) page 1 -page 33; claims 1-49; figures 1,4,6; examples 1-4 ---	1-17
P,X, L	WO 00 61753 A (CORIXA CORP) 19 October 2000 (2000-10-19) L: priority page 1 -page 33; claims 1-60; examples 1-4 -----	1-17



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

° Special categories of cited documents :

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"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 9725431	A	17-07-1997	AU 1575697 A WO 9725431 A1	01-08-1997 17-07-1997
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